



Carrier Hosted Services Basics

What's new in this release?

H.323 services

Following is what's new for H.323 services in (I)SN08:

- Media interoperability between H.323 GWs and Interworking Spectrum Peripheral Module (IW SPM). This includes Dual-Tone Multifrequency (DTMF) relay (out of band to in band, in band to in band with RFC 2833) and T.38 fax. Enhancements for IW SPM to CHS include:
 - IW SPM supports RTP Media Portal insertion for H.323, CICM, and MCS so that Telco networks can communicate with private Enterprise networks that are hidden behind NATs.
 - IW SPM supports mid-call OOB DTMF for H.323 and SIP. DTMF tones from H.323 or SIP clients must be sent via OOB messages when either the non .G711 Private LAN doesn't support sending DTMF via RFC2833 or there is too much packet loss in the G.711 LAN.
 - IW SPM handles mid-call SDP renegotiations and exchanges with H.323 and SIP devices. This capability is required for features like Branding, Music on Hold, and T.38 whereby the CODECs change mid-call.
 - IW SPM complies with RFC3264 SIP SDP Specifications.
- Allows RFC 2833 DTMF support between S 1000, S 1000 M and BCM, with H.323 and other supported VoIP VPN (non H.323)

endpoints. This functionality provides a common method of DTMF transport across SIP and H.323 gateways.

RFC 2833 supports interoperabilities between S 1000, S 1000 M and BCM with the following endpoints:

- CISCO IOS gateways (2600, 3600)
- Westell iQ2030
- MGCP lines, MGCP IAD lines (Mediatrix line)
- Provides support for 2 Calling Line Identities (2CLI) delivery for the following originating agent scenarios with functional equivalency to a terminating PRI trunk:
 - ETSI ISUP v2 Base Variant -> International H.323
 - SPIROU -> International H.323
 - ETSI PRI -> International H.323
 - International H.323 -> International H.323
 - International H.323 -> ETSI PRI
 - International H.323 -> ETSI ISUP v2 Base Variant
 - International H.323 -> SPIROU

The 2 CLI functionality is associated with ISDN supplementary service provisioning option Calling Line Identification Presentation (CLIP) and Calling Line Identification Restriction (CLIR). With the 2 CLI the calling line has two identities: the Network Number (NN) and Presentation Number (PN).

The standard 2 CLI handling mode described as “special arrangement” in H.246 and Q.699 is also supported in this release. In this mode of operation, a user provided CLI is passed on with verification and a second network provided CLI is added to the call signaling by the first public network exchange.

- CS 2000 H.323 gateways interwork with Media Gateway 9000 IP lines. The MG 9000 IP can be used to provide access lines and

services to both residential and Centrex enterprise customers (NA only).

- Advice of Charge (AOC) gives the CS 2000 Call Server the ability to send network incurred charges to the ISDN subscriber within call control or facility messages.

There are three types of ACO service:

- AOC-S Advice Of Charge at call Setup
- AOC-D Advice Of Charge During the call
- AOC-E Advice Of Charge at the End of the call

This activity addresses two AOC services: ACO-D and AOC-E. These services are deployed for originating agents connected to the CS 2000 over H.323. For the AOC calculation, the CS 2000 node has to be configured to determine and apply the tariffs.

- Interoperability between the CS 2000 H.323 Gatekeeper and the Cisco Call Manager. The Call Manager is an IP PBX and appears to the CS 2000 GK as an H.323 gateway. Interoperability would include all applicable CS2K VoIP VPN supported endpoints.
- An increase to the number of PRI D-channels from 2176 to 4094 for the CS 2000. The increase helps address to accommodate gateways in excess of the current limits of 2176 on a per CS 2000 basis.
- T.38 fax calls to and from endpoints residing on H.323 gateways within carrier and enterprise networks where gatekeepers communicate via ACME SD signaling proxy are supported. The following Gatekeepers and Gateways are included:
 - H.323 gatekeepers — CS1000/M, Cisco IOS 3600, Cisco IOS 7200, BCM
 - MGCP based gateways
 - H.323 gateways — Westell, Cisco IOS 2600, Cisco IOS 3700, CS1000/M, BCM
 - H.248 based gateways — Media Gateway 15000
 - MCS
 - MG9000
 - IW/SPM
- H.225 defines RAS (Registration, Admission, and Status) messages and procedures for controlling access to the network. These allow H.323 endpoints to discover and register with an H.323 gatekeeper, to provide information about their capabilities, and to request the allocation of appropriate amounts of bandwidth. For

some applications, H.225/H.245 signaling should be used between CS200 and another entity (softswitch, Gatekeeper, or Gateway) for setting up calls, but with no RAS. This mode of operation is called RASless and is required by certain Carrier-Carrier interconnect environments.

For configuration information, refer to *Associate an H.323 media gateway, Gateway Controller Configuration Manager, NN10205-511*.

- In CHS (I)SN08, ACME Packet's Net-Net Session Director functions as a signaling proxy between the CS 2000 and H.323 Gatekeepers. The Acme Packet Net-Net Session Director is a high performance, high capacity, session border controller that optimally delivers interactive communications—voice, video, and multimedia sessions—across wireline, wireless, and cable IP network borders. H.323 Signaling Proxy allows CHS to interconnect with both GK-routed and direct messaging zones and interwork with non-H.323 gateways at the same time. H.323 signaling can traverse multiple IP address domains, including Private to Public and Private to Multiple Private domains.

Centrex IP services

Following is what's new for Centrex IP services in (I)SN08:

- The Centrex IP Client Manager (CICM) supports Active Call Failover (ACF). Prior to this release, IP terminals could connect to either node of a CICM for service. Should a node fail, all terminals hosted by the defunct node would experience an outage (possibly losing one or more calls) while they rebooted and reconnected to the mate node. The ACF functionality transitions the CICM from a load sharing model to a full takeover redundancy model. With ACF, all terminals connect to the master node of the CICM via a single IP address. Should the master node fail, the mate assumes the role of master, takes over this floating IP address and begins the recovery of terminals while maintaining active calls.
 - Both the H.248 and Unistim interfaces make use of their own floating IP address that is bound dynamically to the master node's interface. Each interface is responsible for managing its floating address and to ensure it is swapped to the mate on a switch of activity, which occurs when the role of the master is transitioned from one node to the other.
 - The inactive node maintains a state of synchronization with the active node. This synchronization allows the inactive node to take over control on a switch of activity.
- Centrex IP Client Manager (CICM) lines support Meridian Business Set (MBS) Group Intercom and Group Intercom All Call. The Group

Intercom (GIC) feature allows a user to call other members of a pre-designated group using abbreviated dialing. The user simply depresses the GIC feature key and dials an abbreviated code. A user can then page the called party via the loudspeaker by hitting GIC key a second time (setting up a one-way speech path) and the called party can then pick up the handset to establish a two-way speech path.

With the Group Intercom All Calls (GIAC) feature, an originator or controller can conference in GIC members when the terminator answers. A GIAC group can have a maximum of 100 members.

- CICM 8.0 adds support for a few additional languages for terminals, as well as a number of country-specific tone sets. The new languages supported are Turkish and Portuguese. The new country-specific tone sets supported are New Zealand, Switzerland, Sweden, Bulgaria, Israel, Portugal, Austria, Ireland, Belgium, Romania, Russia, Mexico, Czech Republic, Turkey, and Venezuela.
- CICM lines support Multiple Appearance Directory Number (MADN) Ring Forward (MRF). MADN Ring Forward provides the capability for MADN Single-Call Arrangement (SCA) groups to ring on a delayed or abbreviated basis for a total of four ring options:
 - Always ring
 - Never ring
 - Ring from call termination until MRF activation (abbreviated)
 - Ring after MRF activation (delayed)

MRF also provides the capability for the user to manually “push” the ringing for an incoming call to the appearances of the MADN designated for delayed ringing by pressing a feature key provisioned with the MRF Manual (MRFM) feature.

MRF activation can be automatic or manual. Automatic ring forwarding is controlled by a timer, which is set on a per-MADN group basis. The automatic version of MRF can also be preempted manually by the user by activating a feature key on the terminal. The manual version of MRF is activated by a feature key on the terminal. That feature key is associated in a datafill with one or more MADN appearances on the terminal, which have the MRF feature.

- The P-phone expansion for CICM lines increases the number of Meridian Business Sets (such as M5216) which can be provisioned in CVoIP offices from the current limit of 31,743 to a new limit of 253,944. The same increase applies to the number of add-on modules (such as M518 and M536) which can be assigned to these sets.

- The Survivable Remote Gateway is supported with the (I)SN08 release of CICM. The Survivable Remote Gateway (SRG) support is located at the Telco premises and offers a secondary fall-back for terminals on the network should the overall communication path to the CICM be lost. With an SRG on site, terminals that lose their connection to the CICM will restart and connect to the SRG. The SRG acts as a very basic call server, able to route calls between terminals on the local network.
- The IP Phone 2033 is a conference terminal that can be deployed in locations where conferencing functionality is the main purpose of the terminal. It emulates the IP Phone 2001 introduced with CICM 7.0 and is now supported with this release.
- In the 2.5 implementation of Unistim Security, once a terminal has been connected securely to a CICM it is tied to that particular CICM as the Fingerprint and Master keys pertain to those of the said CICM. Once in this state the client is not capable of connecting to a different CICM without manual intervention.

A new automated procedure replaces the manual intervention required to transition a large number of terminals from one CICM to another.

- CICM H.248 Call Control Signaling feature upgrades the H.248 protocol stack in the CICM product, incorporating numerous updates and fixes that have been deployed on the MG 9000 platform. In addition, the following functionality changes have been implemented:
 - ESA Entry – support for H.248 duration parameter in association with playing tones
 - SDP Enhancement – maximum length of SDP string increased from 256 to 512 bytes.

Internet Transparency services

Following is what's new for Internet Transparency services in (I)SN08:

- IPsec is used to secure call processing interfaces to and from the RTP Media Portal.
- NAT firewall traversal using the RTP Media Proxy is supported due to the introduction of the SIP lines supporting CS2000, Centrex, H.323, and MCS features. NAT traversal via the RTP Media Portal is provided for CS2000 hosted SIP lines behind a NAT. The capability to set up calls between a SIP line and another endpoint behind the same NAT without inserting a media portal is also provided. It also provides the capability to set up a call between a SIP line and another endpoint behind a different NAT and inserting

only a single media portal. Finally, it provides the capability to provision CS2000 hosted SIP lines behind a NAT.

- In (I)SN08, the Policy Controller (PC) extends the Virtual Call Admissions Control (VCAC) functionality on the CS 2000 Gateway Controller across the network. A network-wide VCAC allows the bandwidth resource through-links in an access network to be shared by all gateways and endpoints on a CS 2000.

Policy Controller applies the default policy to all requests for network resources to enforce call admission control. Resource requests could be in the form of a flow specification or an amount of bandwidth requested. VCAC bandwidth usage calculations monitor bandwidth usage status and make sure enough resources are available for new call requests.

- The (I)SN08 deployment of Network VCAC can support up to 100,000 subscriber endpoints. Network VCAC supports a single CS 2000. Network VCAC does not support multiple CS 2000s or MCS.

Virtual Connections and Admissions Control (VCAC) can be enabled on the CS 2000. For provisioning information, refer to [Enabling VCAC SOC on page 101](#)

- In (I)SN08, the following devices will support the collection and reporting of end-of-call QoS statistics:
 - CICM QoS reporting for client-side media paths through H.248 signaling to the CS 2000 GWC
 - Media Server 2000 QoS reporting through signaling to the CS 2000 GWC
 - Mediant 2000/3000 QoS reporting through signaling to the CS 2000 GWC
 - RTP Media Portal QoS reporting through signaling to the CS 2000 GWC
- RTP Media Portal now detects lost connections and notifies the CS 2000 GWC. RTP Media Portal has two timers: an inactivity timer and a log call duration timer. If either timer expires, the RTP Media Portal notifies the CS 2000 GWC.
 - If the call is active, the CS 2000 GWC resets the times. The call continues.
 - If the call is inactive, the CS 2000 GWC notifies the RTP Media Portal to clear the connection.
- Ensures insertion of a media portal in the bearer path on inter-working calls where the master is the IW SPM (or MG 4000)

and the slave is the GWC of an IP gateway which requires a Media Portal.

SIP services

Following is what's new for SIP services in (I)SN08:

- The Policy Controller provides policy control and policy management for the clients and devices served from the CS2000. The Policy Controller application is a software application that resides on the Session Server. The Policy Controller combines awareness of subscribers with awareness of network resources to assure reliable and predictable network handling of media flows. It migrates CS 2000 GWC functionality and only supports CS 2000 (no MCS) at this time. Only the VCAC policy is supported for the (I)SN08 release. For more detailed information, refer to the Session Server suite of documents listed under [Session Server on page 149](#).

The Policy Controller supports VCAC functionality. In (I)SN07, the GWCs could not share count information among themselves. By moving the VCAC functionality to the Policy Controller, VCAC can be performed on application server-wide basis instead of within one particular GWC's scope of control.

- The limitation of one https proxy connection from IEMS/SSPFS to the Session Server has been removed, allowing multiple https proxy connections and multiple Session Server nodes to reside on the CS-LAN.
- TLS Security on Session Server ensures that TLS version 1.0 (RFC 2246) is utilized for secure SIP message communication for inter-call server communication. With support of TLS by the Session Server, connections to a SIP-enabled server can be secured over a non-secure network.

SIP lines

SIP lines are supported on the CS2000 and the CS2000 compact. SIP lines provided on the CS2000 leverage existing Centrex features on the CS2000 and the SIP services off of the MCS. The SIP lines on the CS2000 provide a ready interface to the existing interworking protocols, OA&M, and network features already supported. SIP lines must support the i200x Nortel phones. SIP lines should also support another third party SIP phones within the following list: Cisco, Avaya, Swissvoice, and Polycom.

The preliminary list of features that must be supported via the i200x and third party SIP phones includes:

- Call forward
- Caller ID
- Calling line ID restriction
- Call waiting
- Call waiting disable
- Conferencing (3 port conferencing)
- Decline
- Do Not Disturb
- Hold (automatic hold)
- Message waiting indicator
- Redirect
- Transfer
- Answering Machine
- User configurable settings

Trimodal Call Server

Trimodal Call Server is a Nortel Networks Call Server which supports the following three Bearer Network Fabric types: ATM, IP, and TDM. It is a solution being provided by Nortel Networks to its customers who want to make a smooth transition from VoATM Carriers to VoIP network solutions and move into the IP Space, leveraging the already existing ATM equipment at their premises.

The (I)SN08 Trimodal Enhancements include the following changes:

- OAM&P Enhancements
- TRK2NET2 and TRK2NET1 OM Tuple allocation enhancement
- Enhancements to include Bearer Network information on the following MAPs:
 - SPM PM, Carrier and Perfmon MAPs
 - ABI XPM MAPs
 - TTP, LTP MAPs
 - DPT MAPs

- Enhancements to the Servord Query Commands QDN, QLEN, QLENWRK, QDNWRK, QHASU, QGRP, QLT, and QCUST command outputs to include Bearer Network information
- When a tuple is added in table NETBRDGE, a Bridge Pool without members is allocated
- Introduce restriction in table NETBRDGE to DISPLAY field contains unique and non-null values, as these values are used in the MAP display and query command enhancements
- New table OFCVAR parameter OSS_PROV_VERSION is added to enable/disable the Servord Query Command enhancements
- Tool QOSSVER is introduced to print out list of activity IDs of features delivered in various loads which have OSS impact
- Integration of H.323 and Centrex IP agencies into the Trimodal solution
- Strategy for upgrading a PT-AAL1 office to UA-Trimodal

The integration of the CHS gateways into the Trimodal solution builds on the IP gateways that are supported in the XA-Core Universal Access-IP solution. This enables interaction between the AAL1 agencies and the CHS agencies when two bridges are inserted in the call (one AAL1 and one IP). AAL1 includes the following gateways: GWC, MG9000, DPT SPM. CHS includes the following gateways: H.3232 and CICM.

Gateway Controller

Following is what's new in (I)SN08 for the Gateway Controller:

- The CS 2000 Gateway Controller card provides an increase to the overall hardware performance over that of the current MCPN750 platform while maintaining the current software functionality. Key areas of performance and capabilities increases are CPU clock speed, and RAM. Additionally, on board Flash memory of 32 Mb or greater is being added.
- GWC allows serial port access with no login, telnet access from the SESM with no login, and telnet access protected by (a single hard-coded) password from any device. There is no idle timeout and no logging of access or commands used. Any user who learns to access PMDebug has full access to tools which range from viewing provisioning data to altering of memory contents on the device, and this can represent a security vulnerability. To add to the secure-ability of the solution, a standardized user-id/password based login for GWC devices is available in (I)SN08. Central account management via the IEMS allows existing defined accounts to be used, as authorized, instead of a separate password

management strategy. Additional standard services like idle timeout and security logging are also provided.

- Dual C-side IP eliminates the requirement to provision a default gateway IP address when provisioning a GWC. The gateway IP will be automatically provisioned for all GWCs. This eliminates provisioning errors. When the call server is an XA-Core, the two available core IP addresses will be automatically distributed across the GWCs.
- IPsec is enabled by default on all GWC profiles that do not currently have the IPsec capability. As a result of enabling IPsec on all remaining GWC profiles, the IPsec provisioning tab will now be available in the CS 2000 Management Tools GUI for all GWC profiles.
- The CS 2000 Gateway Controller generates 5 and 30 minute peg counts on the usage of the RTP Media Portal. The CS 2000 GWC counts the number of successful and unsuccessful attempts against each RTP Media Portal and against all RTP Media Portals supported by the CS 2000 GWC.

Universal Signaling Point

In (I)SN08, the number of simultaneous GUI sessions on a USP system increases to sixteen. Each GUI session is two CLI connections, one each to the two Real Time Controller (RTC) cards of a USP system.

At any given instance the total number of connections to an RTC, GUI sessions and CLI connections together, cannot exceed sixteen. The user-session from on the GUI displays the number of GUI sessions established and their details.

Packet Media Anchor

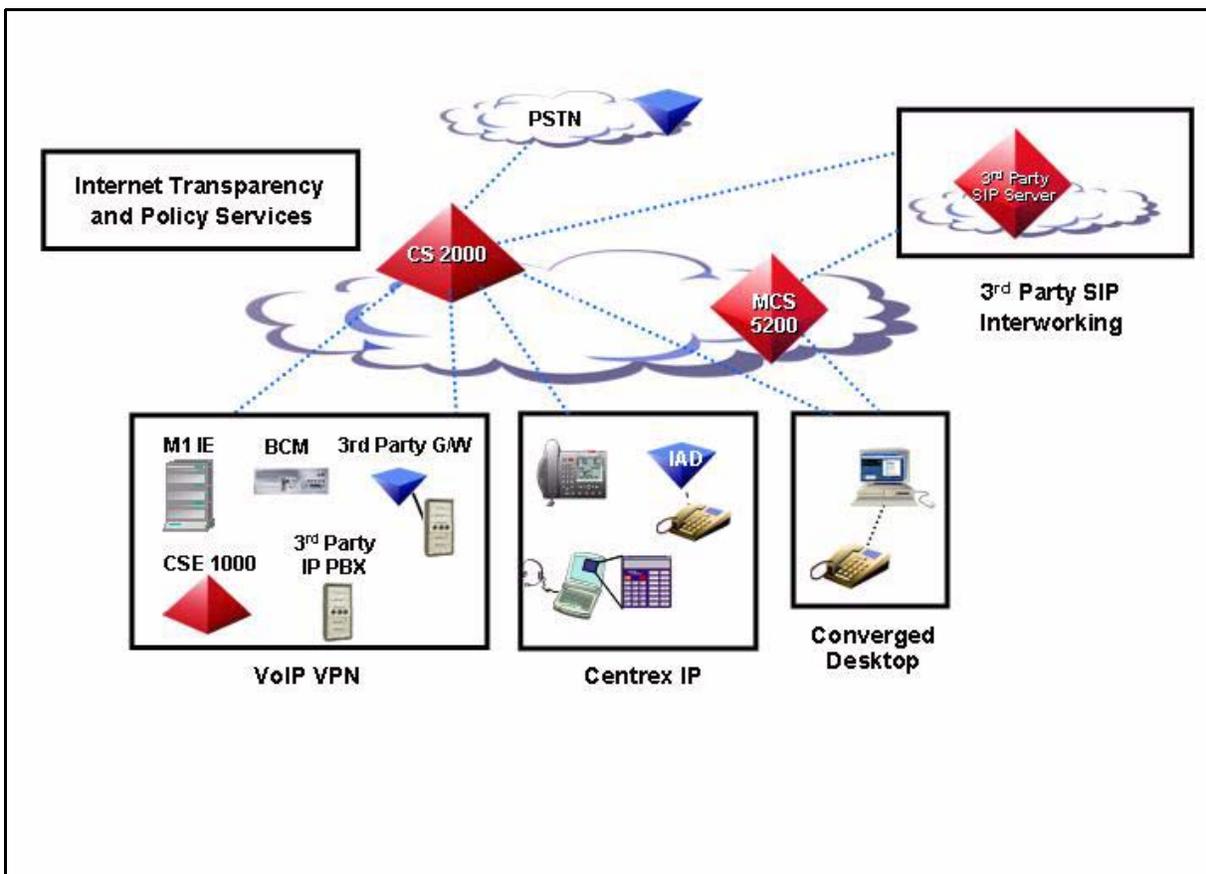
This feature introduces the Packet Media Anchor for the Dynamic Packet Trunking SIP/SIP-T application. The role of the Media Anchor is to provide tone, digit collection, and bearer path anchoring capabilities for the SIP/SIP-T call types. The Audiocodes 2010/2020 has been chosen as the packet gateway to supply media anchoring functionality. The Packet Media Anchor solution uses the bearer channel tandeming (BCT) capability of the AMS to provide media stream anchoring functionality. The media anchor is directed by the CS 2000, which is responsible for managing call topology, resource allocation/deallocation and resource usage. Media anchoring through the AMS does not require conversion from packet to TDM back to packet again, thus impact on bearer path latency will be minimal.

CHS overview

This section provides a high-level view of the Carrier Hosted Services (CHS). CHS is a portfolio of Nortel Networks products and services that provides IP-based solutions to IP network-based subscribers. This solution delivers legacy Digital Multiplex System (DMS) and Succession-based Centrex capabilities to users connected to an IP network using voice multimedia integration. (Centrex is a portfolio of telecommunications services that emulate the private network capabilities of sophisticated, on-premise switching equipment – such as a key system or Private Branch Exchange [PBX] – using the switch and service resources of the public switch network delivered over voice or data lines, or both.)

The following figure shows a high-level view of the network architecture for CHS.

CHS architecture



VoIP technology enables voice to be carried over a packet network. Analog voice signals are digitized, compressed, and transmitted as IP packets over an IP network.

A VoIP call can be initiated from:

- a PC equipped with suitable IP telephony client software (such as Nortel Networks m6350 SoftClient)
- a local area network (LAN)-capable telephone (such as Nortel Networks i200x Etherset)
- an analog/digital phone off of an IP-enabled PBX

CHS components

Overview

The following table lists the components that comprise Carrier Hosted Services, including a brief description of their functions.

CHS components and their functions

Component	Sub-component	Function
Network intelligence		
Communication Server 2000 (CS 2000) 		<p>The CS 2000 solution has evolved from the legacy DMS family of TDM CO switches. The CS 2000 reuses much of the existing DMS TDM service software, as well as the carrier grade DMS hardware.</p> <p>CS 2000 provides the following primary functions</p> <ul style="list-style-type: none"> • call processing (including translations and routing) • Signaling System 7 (SS7) signaling • call feature processing (including features inherited from the DMS switch) • billing
CS 2000	Extended Architecture Core (XA-Core)	<p>The XA-Core is the computing engine of CS 2000. The XA-Core provides maintenance, call processing, and billing functionality. The CS 2000 also sends control messages (for connection set-up) to media gateways (such as the Media Gateway 15000, Multimedia Terminal Adapter, and MG 9000.)</p> <p>The ethernet or high-speed Input/Output Processor (EIOP/HIOP), which resides on the XA-Core, enables the XA-Core to connect to the packet network.</p>
CS 2000	Message Switch (MS)	The MS routes messages from the XA-Core to the Enhanced Network (ENET), Input/Output Module (IOM), Fiberized Link Peripheral Processor (FLPP), and CS 2000 Core Manager.

CHS components and their functions

Component	Sub-component	Function
CS 2000	ENET	The ENET is an optional component. The ENET is the enhanced network for the XA-Core. It is a fully duplicated switching fabric that performs call switching. The ENET provides the messaging path from CS 2000 to any legacy peripherals and is required for access to test trunk facilities.
CS 2000	IOM	The IOM provides input/output (I/O) interface to the CS 2000.
CS 2000	Cabinetized Integrated Service Module (CISM)/ Integrated Service Module Enhanced (ISME) and the Office Alarm Unit (OAU)	The CISM/ISME and the OAU provide test and service circuit functions required by the CS 2000 feature set.
	Integrated Services Module (ISM)	The ISM is a specialized module designed to accommodate test and service circuit packs used in switch and facility maintenance. In a CS 2000 configuration, the ISM houses IOMs. IOMs provide ports for serial input and output, enabling local and remote devices to communicate with the rest of CS 2000 IOMs through the CS 2000 message switch. The IOMs support datalinks that bring the CS 2000 Core Manager or the CS 2000 into service. Each card supports up to 16 ports for 64 Kb/s synchronous V.35 links or 28.8 Kb/s asynchronous RS232 links.

CHS components and their functions

Component	Sub-component	Function
	Office alarm unit (OAU)	<p>The OAU connects a CS 2000 with the office alarm system to provide notification of physical or electrical problems. An OAU consists of two main types of functional elements:</p> <ul style="list-style-type: none"> • Scan points and monitoring devices for collecting environmental input (for example, temperature levels) and detecting state changes in peripheral equipment. • Output devices such as signal distribution points (SDPs) that provide collected information for inclusion in logs and displays, and to activate audible alarms when required. <p>The OAU is directly connected to the Enhanced Network (ENET). The ENET is connected to the MS, which facilitates communication between the ENET and the XA-Core.</p>
CS 2000	Service Application Module 21 (SAM21)	<p>The SAM21 shelf houses the GWC cards. SAM 21 can contain CICM 7.0 cards.</p> <p>All tools and utilities for the SAM21 are provided by CS 2000 SAM21 Manager.</p>

CHS components and their functions

Component	Sub-component	Function
CS 2000	Gateway Controller (GWC) 	<p>The GWCs provide protocol mediation between the CS 2000 and media gateways such as the Media Gateway 15000, MG 9000, and the RTP Media Portal. In other words, the GWCs convert proprietary supervision messages from the XA-Core to protocols recognized by the media gateways.</p> <p>The CS 2000 XA-Core and the CS 2000 - Compact also support the GWC.</p> <p>The GWCs support these protocols:</p> <ul style="list-style-type: none"> • H.248 • H.323 • Automatic System for Performance Evaluation for the Network (ASPEN) • Session Initiation Protocol for Telephony (SIP-T) • ISDN 1.921-User Adaptation (IUA) • Simple Network Management Protocol (SNMP) • MTP3-User Adaptation Layer (M3UA) • packet cable NCS • packet cable Dynamic Quality of Service (DQoS) and Common Open Policy Services (COPS) • RTP Media Portal (MPCP) • PSTN trunk gateways and a PacketCable-compliant cable network (TGCP) <p>Every GWC uses the same hardware and software. Profiles applied at the GWC Manager define the type of GWC.</p>

CHS components and their functions

Component	Sub-component	Function
CS 2000	Session Server	<p>The CS 2000 Session Server is a software application that provides interoperability with third-party application servers and softswitches. The Session Server consists of a Network Equipment-Building System (NEBS) Level 3 compliant hardware platform plus a software framework and architecture for developing Carrier Grade applications and services.</p> <p>The Session Server is the platform for the following applications:</p> <ul style="list-style-type: none"> • SIP gateway application • Policy Controller
	Fiberized Link Peripheral Processor (FLPP)/Link Peripheral Processor (LPP) 	<p>The FLPP/LPP functions as the default SS7 signaling server for evergreen hybrid applications when an existing DMS switch (supporting legacy peripherals) is converted to a CS 2000. FLPP uses SR 128 sub-rate fiber links to connect the CS 2000 to the SS7 network.</p>
CS 2000	Universal Audio Server (UAS) 	<p>The UAS provides media services, such as the delivery of voice announcements, the collection of dual-tone multi-frequency (DTMF) digits, speech recognition, text-to-speech synthesis, speaker verification, audio conferences, and facsimile. The UAS provides voice announcements and facilitates the lawful electronic surveillance of voice and voice-band data traffic in the network (LI). The UAS resides on the SAM16 hardware platform. The UAS has 100 BaseT Ethernet connections to the CS LAN for UAS bearer traffic, as well as for H.248 call control messaging between the UAS and the CS 2000 and for OAM&P messaging between the UAS and the UAS manager.</p>

CHS components and their functions

Component	Sub-component	Function
CS 2000	Audio Provisioning Server (APS)	The APS is a subcomponent of UAS. The APS is required whenever the UAS is used as the announcement server. The APS assures that all UASs in the network use the same announcements. The APS is a non-call processing component. It uses a user-friendly web interface to provision audio services and to set up distribution of announcements to UASs in the network.

CHS components and their functions

Component	Sub-component	Function
CS 2000	Universal Signaling Point (USP) and USP Compact 	<p>The USP is the default SS7 signaling server for new installations (greenfield). The USP supports a redundant 10/100BaseT IP interface. This release provides the following capabilities:</p> <ul style="list-style-type: none"> • high-speed link interface support to signaling transfer point (STP): DS-1 asynchronous transfer mode (ATM) Signaling ATM Adaptation Layer (SAAL) SS7 links (8 DS-0 equivalent) • high-speed link interface support to simple control transmission protocol (SCTP): IETF SIGTRAN SCTP/M2PA IP high-speed link (8-20 DS-0 equivalent) • DS0A, V.35, and channelized T1/E1 low-speed link support • direct messaging to the GWC using M3UA/UDP for TDM ISDN User Part (ISUP) trunking • load sharing between SS7 links • supports co-resident STP capability • support for American National Standards Institute (ANSI) and ETSI ISUP trunks • high service availability of 99.999% and in-service software upgrades during which no calls are lost • in-service LIU7 application upgrade from FLPP to USP • access to HMI through the Ethernet • support for up to 16 multi-point codes • support for up to 440 low-speed SS7 links

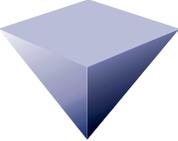
CHS components and their functions

Component	Sub-component	Function
CS 2000	Universal Signaling Point (USP) and USP Compact	<p>The USP - Compact provides the same basic functionality as the USP, but is used for networks with smaller call capacities.</p> <p>The USP - Compact resides on two identical blades in a CS 2000 - Compact or SAM21 shelf and supports up to 16 channelized T1/E1 links and up to 8 multi-point codes.</p>
CS 2000	Communication Server local area network (CS LAN)	<p>The CS LAN provides secure, carrier-grade, fully-redundant routing of call processing, signaling, and management messages between the CS 2000 and the other components in the solution (for example, the Media Gateway 15000, MG 9000, GWCs). (Optionally, the CS LAN can provide a bearer path between components). The CS LAN is fully integrated with the CS 2000, and consists of two Ethernet Routing Switch 8600s with 10/100 BaseT Ethernet or Gigabit Ethernet links to components.</p>
CS 2000 - Compact 		<p>The CS 2000 - Compact is a full-featured, small-footprint alternative to the CS 2000, which is designed for new installations. The CS 2000 - Compact performs call processing, messaging, routing, translations, centralized systems delivery, and storage of office images and system data.</p>
CS 2000 - Compact	Call Agent	<p>The Call Agent is the computing engine of CS 2000 - Compact. The Call Agent provides maintenance, call processing, and billing functionality. The Call Agent also sends control messages (for connection setup) to media gateways (such as the Media Gateway 15000 and MG 9000).</p>

CHS components and their functions

Component	Sub-component	Function
CS 2000 - Compact	STORage Management (STORM)	The STORM card provides network file system (NFS) services to applications running in the CS 2000 - Compact. An NFS is a distributed file system that allows applications to access files and directories on remote computers. STORM acts as an NFS server for the clients running on the Call Agent, and the USP - Compact.

CHS components and their functions

Component	Sub-component	Function
Gateways		
Media Gateway 15000 		<p>Media Gateway 15000 serves as a media gateway in the Voice over IP network. The Media Gateway 15000 supports the H.248 protocol for communication between the GWCs and Media Gateway 15000.</p> <p>The Media Gateway 15000 supports the following functions:</p> <ul style="list-style-type: none"> • tone generation on the TDM side of the gateway, such as basic service tones, basic call progress tones, and expanded call progress tones • in-band DTMF digit collection for ISUP and primary rate interface (PRI) trunk agencies • clear channel data functionality for test trunk capability • modem and fax services over G.711 CODEC standard • software maintenance and release upgrade • carrier-grade attributes, such as Network Equipment Building System (NEBS) Level 3 compliancy, hot swap capability of CP cards, and cold swap capability of voice services processor (VSP) cards • T108 test trunk termination • interworking with TDM trunks through Interworking Spectrum Peripheral Module Internet Protocol (IW-SPM-IP) • two-port Gigabit Ethernet on the VSP3 card

CHS components and their functions

Component	Sub-component	Function
RTP Media Portal 		<p>The CS 2000 uses the Real-time Transport Protocol media portal to establish media paths that span the address spaces of enterprise networks. The CS 2000 uses the media portal as required to bridge the RTP paths between endpoints for CICM NAT traversal.</p> <p>RTP media portal is needed if the endpoints of the media path are not in the same IP address space, as is the case for calls between two enterprises, or calls from an enterprise H.323 gateway to a gateway on the carrier IP network.</p>

CHS components and their functions

Component	Sub-component	Function
Core Network		
Network management		
Integrated Element Management System (IEMS)		<p>IEMS is a next generation element management system that provides a single point of data integration and network management for the Carrier VoIP network.</p> <p>At the central office level, IEMS provides the following functions:</p> <ul style="list-style-type: none"> • Provides graphical topology and inventory relationships between network elements and element management systems • Aggregates all fault and performance data from network elements and element management systems • Provides integrated fault and performance streams to the Network Management Layer • Provides customer choice of operations support system (OSS) interfaces • Provides extensible markup language (XML) aggregation of comma-separated value (CSV) files for performance • Provides centralized fault and performance viewer with filtering capabilities • Provides context-sensitive launching of network management interfaces • Provides enhanced security features by improving the centralization of authentication, authorization, and administration, while also providing interfaces to external security databases • Supports localization in many languages

CHS components and their functions

Component	Sub-component	Function
IEMS	CS 2000 Core Manager	<p>The CS 2000 Core Manager provides OAM&P functionality for the XA-Core and the subtending TDM components of the CS 2000. It resides on the SuperNode Data Manager (SDM) platform and includes much of the SDM's existing OAM&P functionality. CS 2000 Core Manager also provides access to logs for the MG 9000, GWC, UAS, Media Gateway 15000, SAM21 and XA-Core. In addition, the CS 2000 Core Manager provides performance metrics for the XA-Core, MDM, and Media Gateway 15000.</p> <p>The CS 2000 Core Manager provides access to logs, alarms, and performance monitoring data relating to call processing on the CS 2000 - Compact.</p>
IEMS	Core and Billing Manager	<p>The Core and Billing Manager (CBM) provides the OAM&P functionality of the CS 2000 Core Manager. It resides on two Sun Netra 240 servers housed in the Cabinetized Operations Administration and Maintenance (COAM) cabinet. The CBM supports the following applications:</p> <ul style="list-style-type: none"> • SuperNode Billing Application (SBA) • Operational Measurement (OM) delivery • Log streamer • Operations Systems Support (OSS) applications and communication services

CHS components and their functions

Component	Sub-component	Function
IEMS	CS 2000 Management Tools	<p>CS 2000 Management Tools is a suite of network management tools used in Voice over IP solutions. The CS 2000 Management Tools suite consists of the following network management tools:</p> <ul style="list-style-type: none"> • GWC Manager • UAS Manager • Audio Provisioning Server (APS) • APS Manager • SAM21 Manager • Network Patch Manager (NPM) • Nodes Configuration • Trunks Configuration • Carrier Endpoint Provisioning • Lines Configuration • Trunk Maintenance Manager (TMM) • Line Test Manager (LTM) • Lines Maintenance Manager (LMM) • V5.2 Configuration • V5.2 Maintenance • PM Poller • QoS Collector Application
IEMS	Call Agent Manager	<p>The CS 2000 - Compact Call Agent Manager is a menu driven console application that provides access to SAM21 platform alarms, platform performance monitoring, platform logs, platform connectivity, and platform patching. In addition, Call Agent Manager is the primary interface for platform functions such as a cold switch of activity, routine, exercise text, jamming, and synchronization of the call processing application.</p>

CHS components and their functions

Component	Sub-component	Function
IEMS	CS 2000 GWC Manager	The primary function of the CS 2000 GWC Manager is to coordinate the configuration of the CS 2000 GWCs. Also, the CS 2000 GWC Manager is used for fault management of a CS 2000 GWC node.
IEMS	Universal Audio Server Manager (UAS Manager)	The UAS Manager configures the UAS, and monitors fault and performance data for the UAS. The UAS Manager is used with the APS Manager to completely manage the UAS.
IEMS	Audio Provisioning Server Manager (APS Manager)	The APS Manager provides a Web-based GUI that manages announcements from any workstation. The APS Manager client runs on a PC.

CHS components and their functions

Component	Sub-component	Function
IEMS	CS 2000 SAM21 Manager	<p>The CS 2000 SAM21 Manager is a graphical user interface (GUI) that provides access to OAM&P functions such as platform software load, platform diagnostics, platform upgrade, and Network File System (NSF) mount provisioning.</p> <p>In addition, the CS 2000 SAM21 Manager for provisioning the hardware of a CS 2000 GWC, for fault management of a CS 2000 GWC card, and to upgrade the firmware of a CS 2000 GWC.</p> <p>CS 2000 SAM21 Manager has two components: the element manager server and the element manager client.</p> <p>The CS 2000 SAM21 server resides on the same server that hosts the Succession Server Platform Foundation Software (SSPFS) NCL software package (part of the CS 2000 Management Tools software). Currently, the SSPFS package runs on a Sun Netra t1400 or Netra 240.</p> <p>The CS 2000 SAM21 element manager client runs on either a PC or Sun Solaris machine and provides a GUI of the physical layout of the SAM 21 shelf for fault management and configuration management of the SAM21 shelf.</p>
IEMS	Trunk Maintenance Manager (TMM)	<p>The TMM provides an XML interface that allows client applications (GUIs) to perform basic maintenance operations on GWC-managed trunks, such as posting, busying, and returning to service.</p>
IEMS	Lines Maintenance Manager (LMM)	<p>LMM provides an XML interface that allows you to use client applications (GUIs) to perform basic maintenance operations on GWC-managed lines, such as posting, busying, and returning to service.</p>

CHS components and their functions

Component	Sub-component	Function
IEMS	Session Server Manager	<p>The Session Server Manager is a web-based interface residing on the Session Server to perform the provisioning and maintenance activities. This interface consists of a web system running on the Session Server Manager that provides provisioning web pages as well as maintenance related web pages.</p> <p>Note: The Session Server can be configured to use IEMS between the customer operation LAN and the CS 2000 LAN or it can be configured without IEMS.</p>
IEMS	Universal Signaling Point (USP) Manager	<p>USP Manger is a Windows 2000 workstation that provides a GUI for provisioning and monitoring SS7 interfaces. USP Manager also provides backup and software upgrade facilities for the USP.</p>
IEMS	MG 9000 Manager	<p>The Media Gateway 9000 Manager (MG 9000 Mgr) allows technicians to remotely manage all MG 9000 components in a CVoIP network. The MG 9000 is a client-server application that consists of the following components:</p> <ul style="list-style-type: none"> • Server software that resides on a central server • Mid-tier database between the client and server for data storage <p>The MG 9000 Mgr supports most common management operations, including the following:</p> <ul style="list-style-type: none"> • Network element discovery • Equipment provisioning • Carrier provisioning • Service provisioning • Fault handling and reporting • Operational measurements

CHS components and their functions

Component	Sub-component	Function
IEMS	STORage Management Manager (STORM Manager)	<p>The STORM Manager is used with CS 2000 - Compact. The STORM Manager is a Web-server application that runs on the STORM card. The STORM Manager allows you to</p> <ul style="list-style-type: none"> • Provision and control application-level STORM functions. • Modify STORM file systems. • View STORM logs.
IEMS	Device Manager (for Ethernet Routing Switch 8600)	<p>The Device Manager (for Ethernet Routing Switch 8600) is a suite of GUI applications that allows you to manage and configure an Ethernet Routing Switch 8600 chassis. It can be launched independently or as part of Optivity.</p>
IEMS	Multiservice Device Manager (MDM)	<p>MDM allows you to manage Media Gateway 15000. MDM allows you to perform fault management, configuration management, data collection, performance management, and security management. In addition, MDM forwards Media Gateway 15000 performance management, and fault management information to the CS 2000 Core Manager. The MDM resides on a Sun-based workstation.</p>

CHS components and their functions

Component	Sub-component	Function
Centrex IP		
Centrex IP Client Manager		<p>The Centrex IP Client Manager (CICM) delivers Centrex capabilities to users connected to an IP network using VoIP technology. The CICM performs the following functions:</p> <ul style="list-style-type: none"> • provides the interface between the Centrex feature set and an IP network • transcodes voice between IP data and the client network and PCM data from the XPM <p>The CICM client allows a user to initiate and receive VoIP calls and to receive Centrex features from the CS 2000.</p> <ul style="list-style-type: none"> • the m6360 SoftClient application • the Nortel Networks IP Phone 200x Etherset telephones <p>For more information on CICM, refer to <i>CICM Basics</i>, NN10044-111.</p>

MCS 5200 required functional components

The MCS 5200 includes several functional components, some of which are required and others that are optional. Both the MCS 5200 and the CS 2000 utilize MCS RTP Media Portals for NAT/firewall transversal. There are two possible management system configurations for MCS RTP Portals associated with a CS 2000: shared and dedicated.

In the shared configuration, the MCS RTP Media Portals associated with the CS 2000 are managed using the management system modules that are provided with an MCS 5200 system.

In the dedicated configuration, the MCS RTP Portals associated with the CS 2000 are managed by separate MCS Management and Database Modules, and System Management Console. The dedicated configuration can be used when an MCS 5200 is not present or when an MCS 5200 is present but with its own set of dedicated MCS Management and Database Modules, and System Management Console.

The following table shows the required functional components that comprise the MCS 5200 platform.

MCS 5200 functional components (required)

MCS 5200 components	Description
	<p>The Session Manager is the MCS 5200 service execution engine that provides the following software functionality:</p> <ul style="list-style-type: none">• SIP Proxy Server• Back-to-Back User Agent (BBA)• SIP Registrar• CPL Interpreter• address resolution and routing capabilities <p>The Session Manager is dual-homed. As an optional software feature of the Session Manager, the SIP Presence Module processes information for presence subscription and notification.</p> <p>For more information, refer to <i>MCS 5200 Session Manager Basics, NN10029-111</i>, and <i>MCS 5200 Presence Basics, NN10236-111</i>.</p>

MCS 5200 functional components (required)

MCS 5200 components	Description
	<p>The System Manager provides the services that support communication amongst the Multimedia Communication Server network elements and management requests issued from the System Management Console or the Open Management Interface (OMI). It provides the software functionality that:</p> <ul style="list-style-type: none"> • manages the following functions for the MCS 5200 components, media server, and the gateways: <ul style="list-style-type: none"> — faults — configuration — performance • collects operations, administration, and maintenance (OAM) information for display on the System Management Console <p>The System Manager is located in the private MCS 5200 network. The System Management Console is the administrator's interface to the Management Module.</p> <p>For information on the System Manager, refer to <i>MCS 5200 System Manager Basics, NN100030-111</i>. For information on the System Management Console, refer to <i>MCS 5200 System Management Console Basics, NN10247-111</i>.</p> <p>For information on the System Manager in the dedicated configuration to support MCS RTP Media Portals associated with the CS 2000, refer to the <i>CVoIP System Manager Basics, NN10369-111</i>. For information on the System Management Console in the dedicated configuration to support MCS RTP Media Portals associated with the CS 2000, refer to the <i>CVoIP System Management Console User Guide, NN10370-111</i>.</p>

MCS 5200 functional components (required)

MCS 5200 components	Description
	<p>The Database Manager functionality is comprised of several software components: Oracle database software, Database Manager component, and the Database Instance Monitor component. The Oracle database is accessed by some network components in order to provide storage and retrieval for:</p> <ul style="list-style-type: none"> • subscriber location information • registration status based on information received with SIP client registration • routing and translation entries • system configuration data <p>The Database Manager functionality is located on the private MCS 5200 network. For more information, refer to <i>MCS 5200 Database Manager Basics, NN10031-111</i>.</p> <p>For information on the Database Manager in the dedicated configuration to support MCS RTP Portals associated with the CS 2000, refer to the <i>CVoIP Database Manager Basics, NN10368-111</i>.</p>
	<p>The Accounting Manager provides a mechanism for receiving, storing, formatting, and transmitting accounting information for billing purposes.</p> <p>The Accounting Manager is located on the private MCS 5200 network. For more information, refer to <i>MCS 5200 Accounting Manager Basics, NN10037-111</i>.</p>

MCS 5200 functional components (required)

MCS 5200 components	Description
	<p>The Provisioning Manager provides the interface for the access clients (Multimedia PC Client, Multimedia Client Set, Provisioning Client, and Personal Agent) to securely access the data stored in the Oracle Database. It supports the following tasks:</p> <ul style="list-style-type: none"> • service provider provisioning through the Provisioning Client • customer domain provisioning through the Provisioning Client • setting up network services functions, such as the network address book • enabling the administrator to do bulk provisioning either through an API or through a command line interface (CLI) <p>Within the Provisioning Manager, a Sun ONE Web Server* processes HTTP requests from the Multimedia Web Client, Personal Agent, and Provisioning Client to support self provisioning and network-based services.</p> <p>The Provisioning Manager is dual-homed. For more information about the Provisioning Manager, refer to <i>MCS 5200 Provisioning Manager Basics, NN10242-111</i>, and <i>Provisioning Client User Guide, NN10043-113</i>. For more information on provisioning tasks that the Provisioning Manager processes, refer to the following documents:</p> <ul style="list-style-type: none"> • <i>Multimedia PC Client Manager User Guide, NN10041-113</i> • <i>IP Phone 2002 User Guide, NN10319-113</i> • <i>IP Phone 2004 User Guide, NN10042-113</i>

MCS 5200 functional components (required)

MCS 5200 components	Description
<p data-bbox="219 363 527 426">System Management Console</p>  <p data-bbox="297 732 545 753">System Management Console</p>	<p data-bbox="597 363 1333 426">The System Management Console is the element manager GUI for MCS 5200. With this GUI you can:</p> <ul data-bbox="597 443 1398 743" style="list-style-type: none"> <li data-bbox="597 443 1235 506">• administer system, database, and service components <li data-bbox="597 522 1398 585">• deploy and configure MCS 5200 system sites, servers, modules/components, and services <li data-bbox="597 602 1398 665">• monitor the MCS 5200 system using alarms, logs, and performance measurements <li data-bbox="597 682 1321 743">• manage collection of operations, administration, accounting, and maintenance information <p data-bbox="597 760 1398 947">The System Management Console runs on a personal computer (PC) and communicates with the System Manager on the private MCS 5200 network. For more information about the System Management Console, refer to <i>MCS 5200 System Management Console Basics</i>, NN10247-111.</p> <p data-bbox="597 963 1390 1121">For information on the System Management Console in the dedicated configuration to support MCS RTP Media Portals associated with the CS 2000, refer to the <i>CVoIP System Management Console User Guide</i>, NN10370-111.</p>

MCS 5200 optional functional components

The following table lists the optional functional components that comprise the MCS 5200.

MCS 5200 functional components (optional when using Sun Netra servers)

MCS 5200 component	Description
	<p>The IP Client Manager manages the IP Phone 200x. It provides them access to MCS 5200 SIP services. The IP Client Manager provides access to the following features:</p> <ul style="list-style-type: none"> • Instant Messaging • information delivery services • session-handling services • call management services <p>The IP Client Manager is dual-homed. It performs the SIP to UNISim conversion that enables the interworking of IP Phone 200x with the SIP Application Module.</p> <p>For more information on the IP Client Manager, refer to the following documentation:</p> <ul style="list-style-type: none"> • <i>MCS 5200 IP Client Manager Basics, NN10032-111</i> • <i>IP Phone 2002 User Guide, NN10319-113</i> • <i>IP Phone 2004 User Guide, NN10042-113</i>

MCS 5200 Media Servers

The following table lists brief descriptions of the MCS 5200 media servers.

MCS 5200 media servers

Media servers	Description
	<p>The SIP Audio Server provides network-wide, Ad hoc audio conferencing for the MCS 5200 access clients. These capabilities include:</p> <ul style="list-style-type: none"> • support for up to 32 port audio conferences • independent Coder/Decoder (CODEC) negotiation for each conference call port • mid-session broadcast of SIP info signals to all conference parties (for example, a Web page URL) • hold/retrieve • round-robin resource allocation (for selecting media resources for conference calls) • long call service • call transfer • chaining conferences together (During a conference call on the SIP Audio Server, any client may add additional clients onto the conference call.) • authenticating SIP Application Module sending a request <p>The SIP Audio Server is located on the private MCS 5200 network. For more information on the SIP Audio Server, refer to <i>MCS 5200 SIP Audio Server Basics, NN10034-111</i>.</p>

MCS 5200 media servers

Media servers	Description
	<p>The RTP Media Portal is a network-distributed component that provides the following functions:</p> <ul style="list-style-type: none"> • performs media-stream network address translation and network address port translation (NAT/NAPT) • provides a media firewall • provides third-party media controls • enables a client firewall/NAPT traversal mechanism <p>The RTP Media Portal handles media streams using the Real-time Transport Protocol (RTP) and Real-time Transport Control Protocol (RTCP).</p> <p>For more information on the RTP Media Portal, refer to <i>MCS 5200 RTP Media Portal Basics, NN10035-111</i>.</p>
	<p>The Media Application Server (MAS) is a generic media processing platform that combines the latest voice over IP (VoIP) protocols and standards with the most successful internet development specifications and paradigms. It uses commercial hardware platforms and common operating systems without the presence of hardware-based digital signal processor (DSP) resources.</p> <p>The MAS platform is a stand-alone component that interfaces to both the control-planes and bearer-planes of the network. The control-plane uses Session Initiation Protocol (SIP) for signaling, while the bearer-plane uses both the RTP and RTCP for media.</p> <p>The MAS supports the following services:</p> <ul style="list-style-type: none"> • Ad hoc audio conferencing • Meet me audio conferencing <p>These services run on separate MASs. For more information on the MAS, refer to <i>MCS 5200 Media Application Server Basics, NN10010258-111</i>.</p>

RTP Media Portal

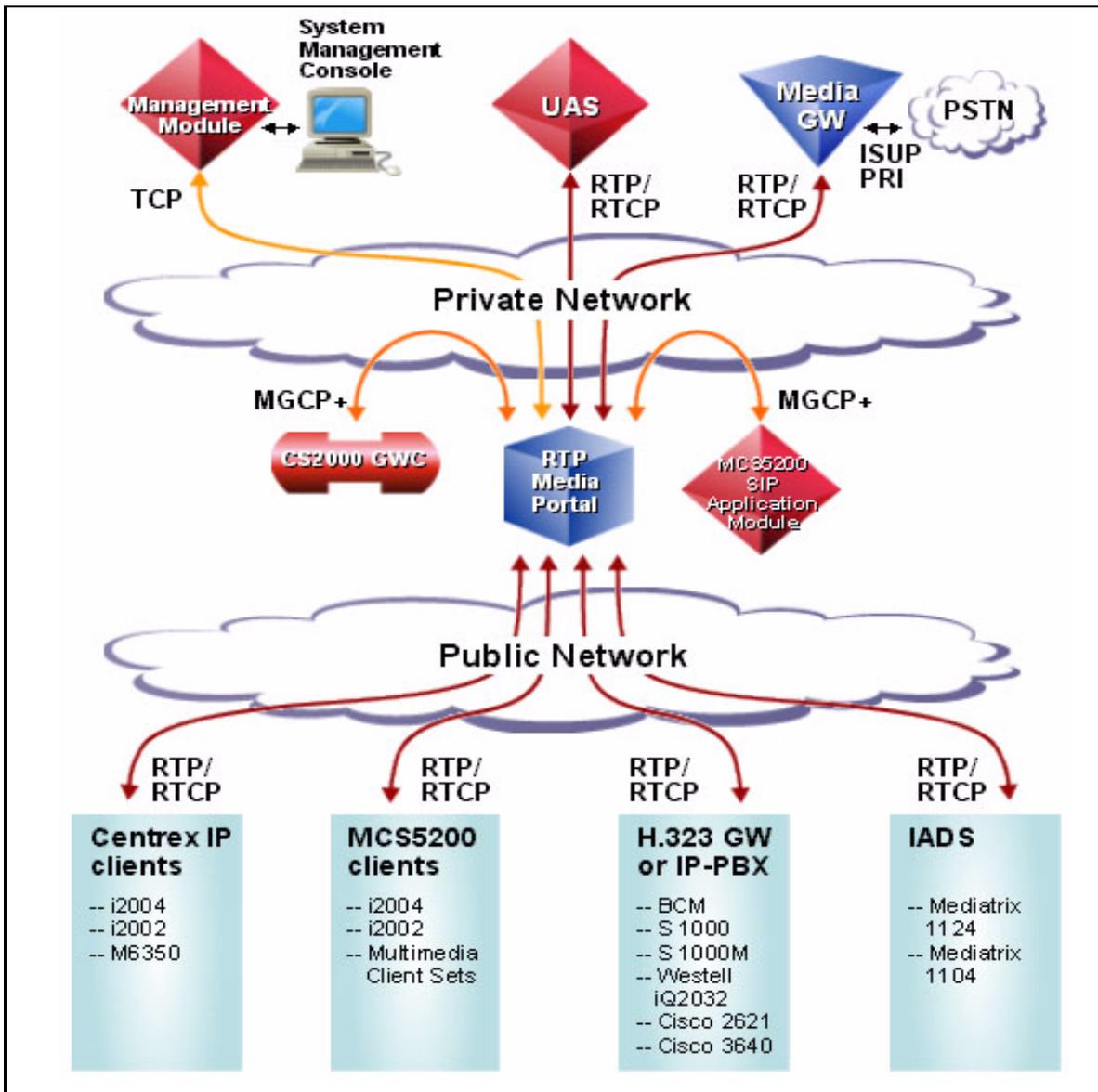
The RTP Media Portal service addresses media-specific issues with advanced service delivery, Internet addressing efficiencies, and system security. It functions as a media Network Address Port Translation (NAPT) point that shields private network components from external

exposure through leaks in the media streams. The RTP Media Portal also enables elements in the private network to communicate safely with elements in the private network.

The RTP Media Portal provides IP address/port pair mapping between internal and external network components, and media anchoring and media pivot abilities for terminals. For NAPT functionality, the media portal relays packets between two end points located in different networks using the same or different IP address spaces. The RTP Media Portal can perform NAPT on both the source and destination IP addresses for every media packet authorized to traverse.

The following figure shows RTP Media Portal interworking among other components.

RTP Media Portal network interoperability



In this figure, the clouds represent two distinct networks. The private network cloud interacts with the public network cloud through the different edge components. The RTP Media Portal provides media-layer functionality for RTP, Real Time Transport Control Protocol (RTCP), and User Datagram Protocol (UDP) transmissions.

A call control signaling channel is established between the H.323 gateway and the CS 2000. If the GW and the CS 2000 reside in separate IP-VPNs (different IP address domains that cannot route directly to one another), dynamic discovery and keepalive are

supported on the gateways and GWCs to provide another mechanism for GW->CS2K communication. Discovery provides another mechanism for GW->CS2K communication.

The RTP Media Portal is only required if endpoints are on different network domains and IP address spaces. These endpoints can be different IP VPNs or between a Carrier and Enterprise IP VPN domains.

MCS 5200 gateway

The following table lists brief descriptions of the MCS 5200 gateway.

MCS 5200 Gateway

Gateway	Description
	<p>The SIP PRI Gateway converts packet-based voice streams to circuit-based voice streams to allow SIP endpoints the ability to connect to PSTN devices. Some of its functions include:</p> <ul style="list-style-type: none"> • PRI call handling • CODEC negotiation • calling party name and number delivery to SIP • parameter mapping between SIP and PRI protocols <p>The SIP PRI Gateway is located on the MCS 5200 private network. For more information on the SIP PRI Gateway, refer to <i>MCS 5200 SIP PRI Gateway Basics, NN10250-111</i>.</p>

MCS 5200 access clients

The MCS 5200 access clients include SIP user agents that provide subscribers access to the MCS 5200 network, administrator and subscriber provisioning interfaces, and an interface for administrative system management. User agents can be hardware components, such as an IP Phone, software applications running on a PC, or software applications executed from a web browser.

The following table lists brief descriptions of the MCS 5200 access clients.

MCS 5200 access clients (Sheet 1 of 5)

Access client	Description
<p>Note: Subscriber access to the SIP services network requires one of the following clients: Multimedia PC Client, IP Phone 2002, IP Phone 2004, Multimedia Web Client, or Multimedia Client Set.</p>	
 <p data-bbox="318 831 456 877">Multimedia PC Client</p>	<p>The Multimedia PC Client is a stand-alone SIP-enabled user agent installed on a Personal Computer (PC) that provides access to SIP features and services such as:</p> <ul style="list-style-type: none"> • traditional telephone services • multimedia communications <ul style="list-style-type: none"> — video calls — Instant Messaging — file sharing/file transferring — whiteboard session — Web page push • communication management <ul style="list-style-type: none"> — directory — call logs — Friends Online — address book <p>The Multimedia PC Client is located on the managed public network. It accesses the SIP services network through the SIP Application Module. For more information on this multimedia client, refer to the <i>Multimedia PC Client User Guide</i>, NN10041-112, and <i>MCS 5200 Feature Description Guide</i>, NN10251-115.</p>

MCS 5200 access clients (Sheet 2 of 5)

Access client	Description
	<p>The IP Phone 2002 is a MCS 5200 hard client device that provides a traditional looking telephone set enhanced with multimedia features for accessing IP-based MCS 5200 SIP services. It provides a two line display to enable multimedia services. Some of the IP Phone 2002 advanced features include:</p> <ul style="list-style-type: none"> • Instant Messaging • stock query • call forward • do not disturb • multiple user login (4 simultaneous users) • bulletins • Quality of Service (QoS) information <p>The IP Phone 2002 is located on the managed public network and is managed by the IP Client Manager (IPCM). For a complete list of features, refer to of this chapter. For more information on the IP Phone 2002, refer to the <i>IP Phone 2002 User Guide, NN10041-112</i>, and <i>MCS 5200 Feature Description Guide, NN10251-115</i>.</p>
 <p>i2004 Internet Telephone</p>	<p>The IP Phone 2004 is a Nortel Networks MCS 5200 hard client device that provides a traditional looking telephone set enhanced with multimedia features for accessing IP-based MCS 5200 SIP services. It provides a large, multiple line display to enable multimedia services. Some of the IP Phone 2004 advanced features include:</p> <ul style="list-style-type: none"> • Instant Messaging • stock query • call forward • do not disturb • multiple user login (6 simultaneous users) • bulletins • QoS information <p>The IP Phone 2004 is located on the managed public network and is managed by the IP Client Manager (IPCM). For more information on the IP Phone 2004, refer to the <i>IP Phone 2004 User Guide, NN10042-113</i>, and <i>MCS 5200 Feature Description Guide, NN10251-115</i>.</p>

MCS 5200 access clients (Sheet 3 of 5)

Access client	Description
 <p>Multimedia Client Set</p>	<p>The IP Phone 200x provides voice services, while the PC provides all other services. When the Multimedia PC Client is configured to control the IP Phone 200x, the configuration is known as the Multimedia Client Set. The Multimedia Client Set provides access to SIP features and services such as:</p> <ul style="list-style-type: none">• traditional telephone services• multimedia communications<ul style="list-style-type: none">— video calls— Instant Messaging— file sharing/file transferring— whiteboard session— Web page push• communication management<ul style="list-style-type: none">— global address book— call logs— Friends Online— personal address book <p>For more information on the Multimedia Client Set, refer to the <i>Multimedia PC Client User Guide, NN10041-112</i>; <i>IP Phone 2002 User Guide, NN10319-113</i>; <i>IP Phone 2004 User Guide, NN10042-113</i>; and <i>MCS 5200 Feature Description Guide, NN10251-115</i>.</p>

MCS 5200 access clients (Sheet 4 of 5)

Access client	Description
 <p>Provisioning Client</p>	<p>The Provisioning Client is a browser-based tool that allows service providers to provision:</p> <ul style="list-style-type: none">• administrators• domains• gateways• IP Client Managers• voice mail servers• service packages• telephony routing translations <p>The Provisioning Client is accessed from the public network. It is accessed by administrators for communicating provisioning data to the MCS 5200 network. For more information on the Provisioning Client, refer to the <i>Provisioning Client User Guide, NN10043-113</i>.</p>

MCS 5200 access clients (Sheet 5 of 5)

Access client	Description
 <p>Personal Agent</p>	<p>The Personal Agent is a browser-based client that allows users to perform network-based management with their own MCS 5200 services and communication preferences. Features include:</p> <ul style="list-style-type: none"> • Routes: to define call screening and routing behavior • Preference: to modify personal information and services • Directory: to manage key contact information; access personal and global address books • Click-to-call: to establish a call between two parties • Multimedia Web Client: to launch multimedia web client <p>For more information on the Personal Agent, refer to the <i>Personal Agent User Guide, NN10039-112</i>, and <i>MCS 5200 Feature Description Guide, 10251-115</i>.</p>
 <p>Multimedia Web Client</p>	<p>The Multimedia Web Client is a Web-based access client that provides various multimedia and telephony features such as:</p> <ul style="list-style-type: none"> • traditional telephone services • multimedia services <ul style="list-style-type: none"> — video calls — Instant Messaging — Web page push • communication management <ul style="list-style-type: none"> — global address book — call logs — Friends Online — personal address book <p>The Multimedia Web Client is located on the managed public network. Because this multimedia client is browser-based, it is easy to add and deploy new services as they become available. When the Web Client Manager is updated, subscribers automatically have access to any updated Multimedia Web Client functionalities.</p> <p>For more information on the Multimedia Web Client, refer to the <i>Multimedia Web Client User Guide, NN10040-112</i>, and <i>MCS 5200 Feature Description Guide, NN10251-115</i>.</p>

Call processing in Carrier Hosted Services

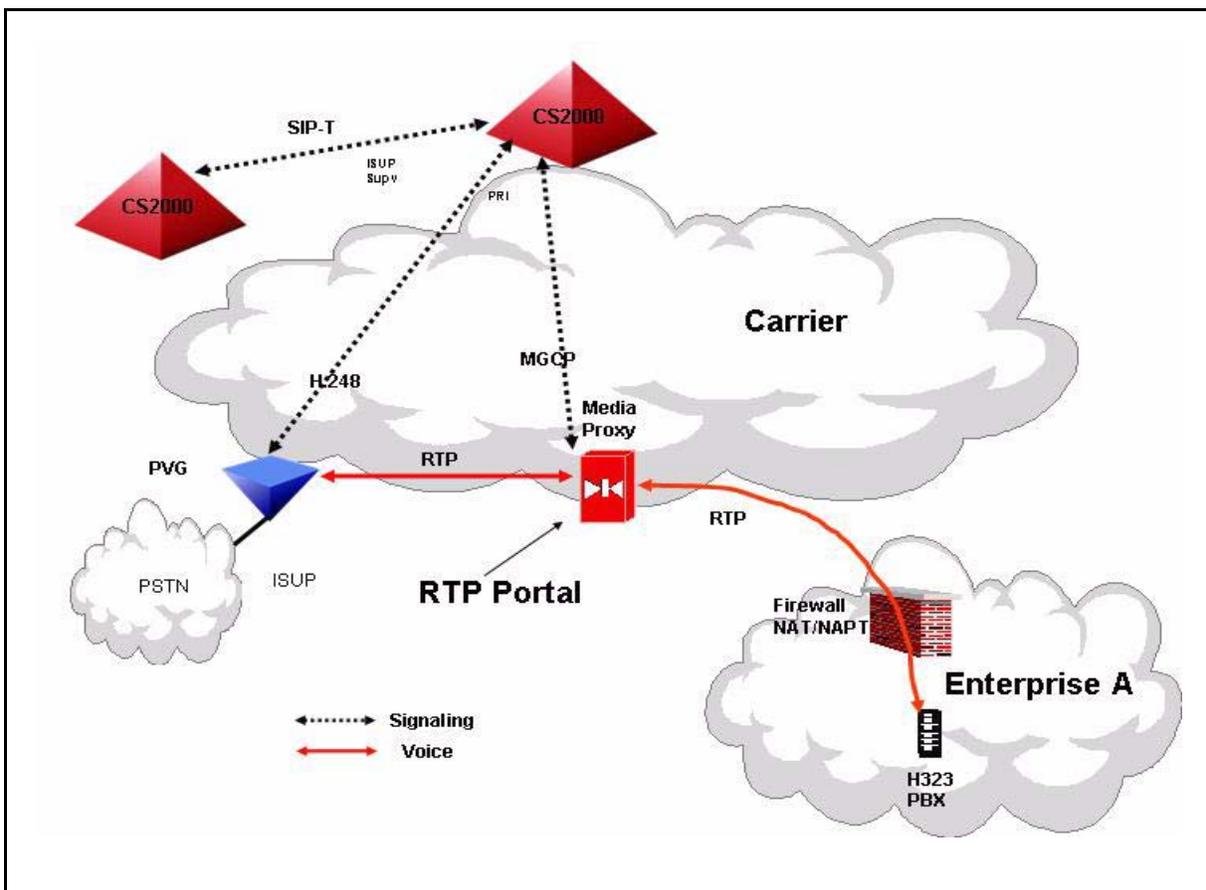
Overview

This section briefly describes the call processing flows for the products and applications associated with the Carrier Hosted Services.

VoIP VPN

The following figure shows a high-level view of the call control and media paths in a network with VoIP VPN.

VoIP VPN call flow



CICM

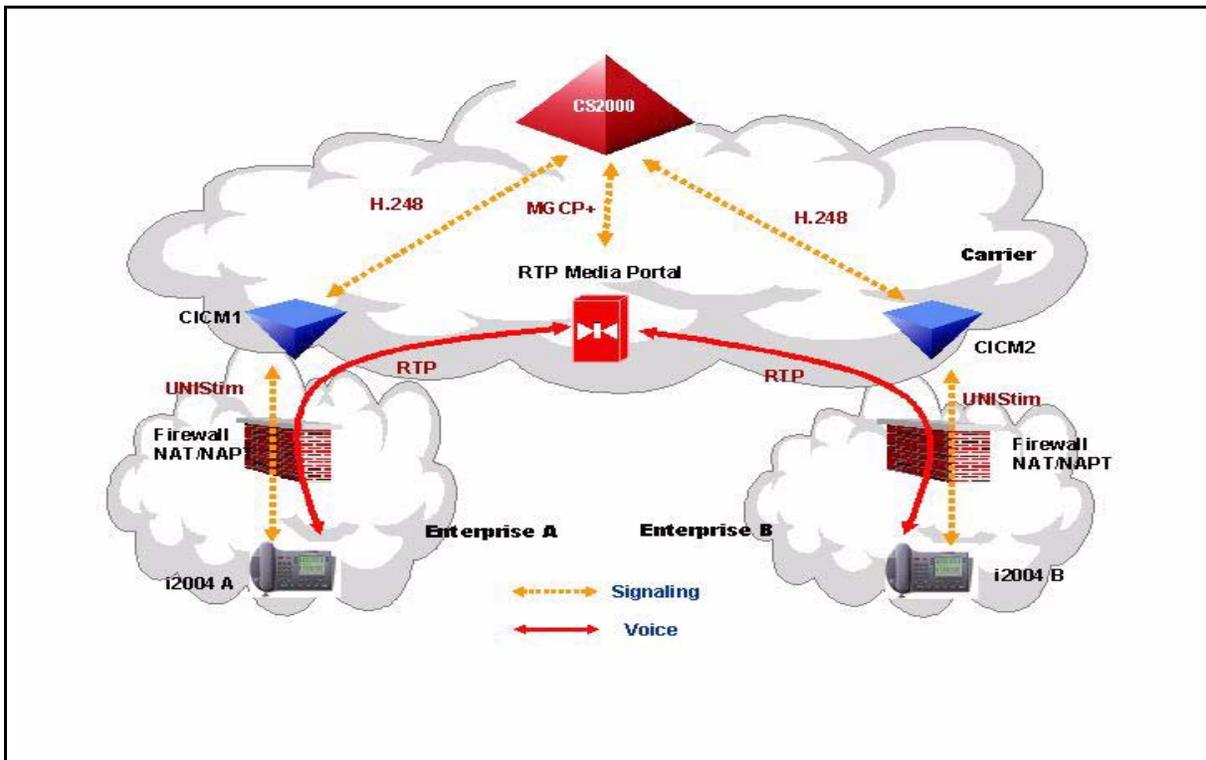
CICM converts UNISlim messages between the CICM and the Centrex IP clients to H.248 messages to the Communication Server.

Unlike TDM deployments, the CICM does not transport the media streams. The RTP Media Portal proxies the voice packets between the two end points if they are in different IP-VPNs or network address

domains. If they are not in different IP-VPNs or network address domains, then the RTP voice packets are routed directly between the two endpoints. (For example, a call between two gateways in the same IP-VPN does not go through the RTP Media Portal. The RTP Media Portal is required only if there is a need to traverse an IP-VPN boundary.)

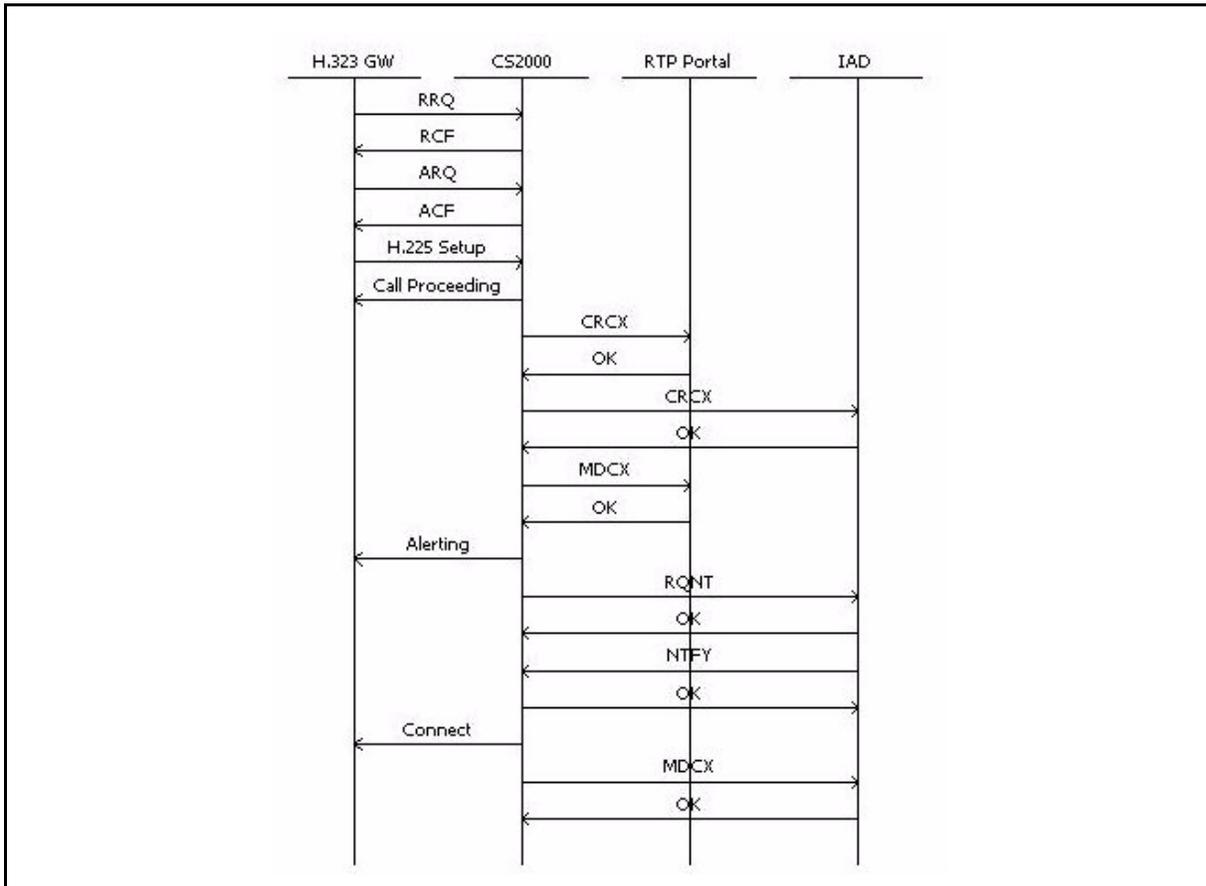
The following figure shows a call flow using Centrex IP and CICM.

Centrex IP call flow



The following figure shows an example of a call setup for an H.323-to-MGCP IAD call.

VoIP VPN-to-MGCP IAD call setup



In the [VoIP VPN-to-MGCP IAD call setup](#) figure, the H.323 gateway registers with the communication server, which functions as a gatekeeper. The H.323 gateway sends an Admission Request (ARQ) to the communication server for the call. The communication server responds with an Admission Confirmation (ACF) to indicate that the gatekeeper-routed signaling applies for this call. The H.323 gateway then sends the H.225 setup message to the communication server. (Translations and routing determine that the terminating node is an MGCP IAD.)

After translations and routing has completed, the communications server determines that an RTP Media Portal must be inserted. A Create Connection (CRCX) message is sent to the portal, which responds with an embedded RTP message port to the terminating IAD.

The communication server sends an MGCP Modify Connection (MDCX) message to the RTP Media Portal to set up the second leg of the connection. The RTP Media Portal responds with the RTP port that is to be used by the originating H.323 gateway.

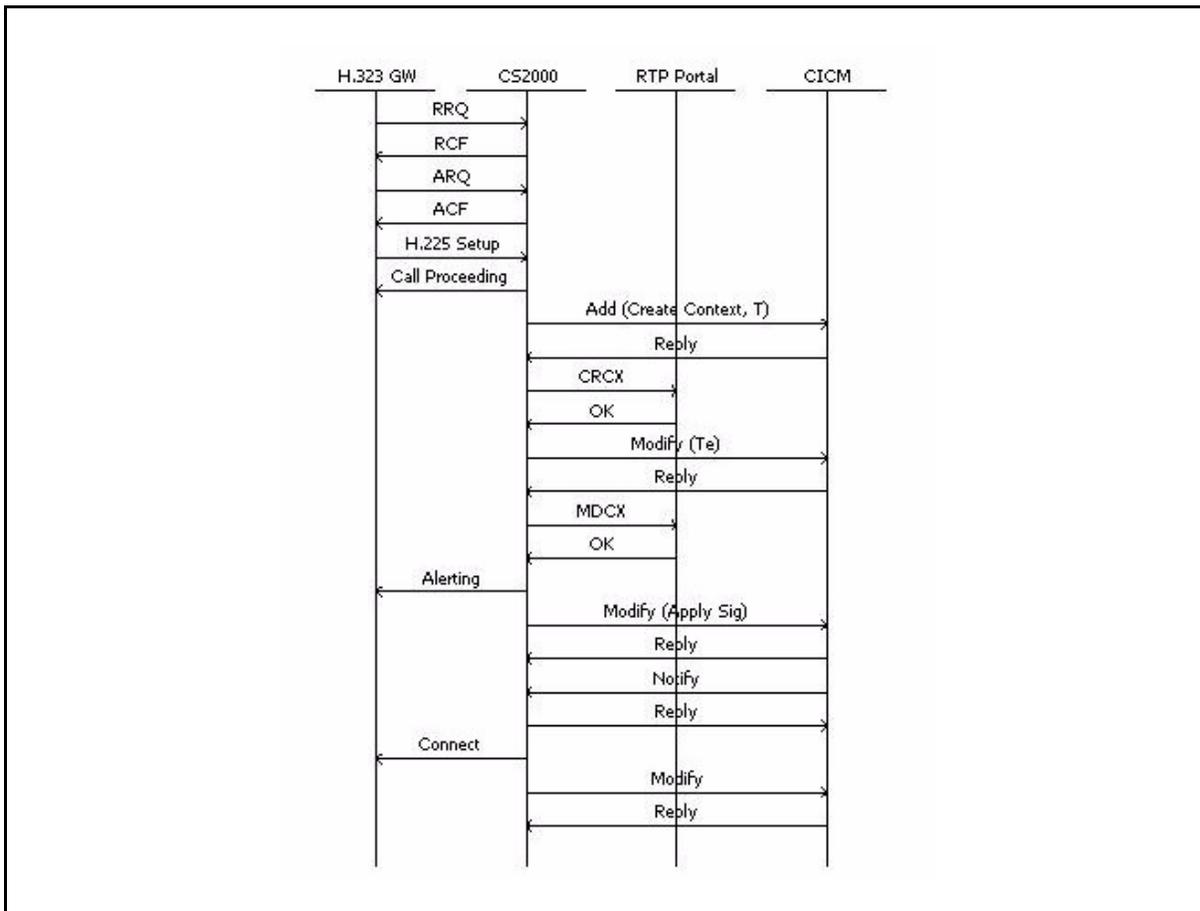
The communication server sends the Alerting message to the originating H.323 gateway, including the RTP port that should be used on the RTP Media Portal. The communication server then sends a Request Notification (RQNT) to the terminating IAD, directing it to apply ringing and provide notification when it has detected an off-hook.

The IAD sends a Notify (NTFY) when it has detected an off-hook. The communication server sends a Connect message to the originating H.323 gateway, and an MDCX message to the terminating IAD for the following purposes:

- to remove ringing
- to set the connection mode to SENDRECV
- to request notification when it detects flash or on-hook has occurred

The following figure shows an example of a call setup for an H.323-to-H.248 CICM call.

VoIP VPN-to-H.248 CICM call setup



In the [VoIP VPN-to-H.248 CICM call setup](#) figure, the H.323 gateway registers with the communication server, which functions as a gatekeeper. The H.323 gateway sends an ARQ to the communication server for the call. The communication server responds with an ACF to indicate that the gatekeeper-routed signaling applies for this call. The H.323 gateway then sends the H.225 setup message to the communication server. (Translations and routing determine that the terminating node is a CICM.)

The communications server sends an H.248 Add message to the CICM to create a new context identifier with a termination. (The context identifier is returned in the H.248 response.)

The communications server determines that an RTP Media Portal must be inserted. A CRCX message is sent to the portal, which responds with an embedded RTP message port in an H.248 Modify message. The H.248 Modify message updates the ephemeral termination in the CICM context.

The communication server sends an MDCX message to the RTP Media Portal to set up the second leg of the connection. The RTP Media Portal responds with the RTP port that is to be used by the originating H.323 gateway.

The communication server sends the Alerting message to the originating H.323 gateway, including the RTP port that should be used on the RTP Media Portal. The communication server then sends an H.248 Modify message to the CICM, directing it to apply ringing and provide notification when it has detected an off-hook.

The CICM sends an H.248 NTFY message when it has detected an off-hook. The communication server sends a Connect message to the originating H.323 gateway, and an H.248 Modify message to the CICM for the following purposes:

- to remove ringing
- to set the connection mode to SENDRECV
- to request notification when it detects flash or on-hook has occurred

For more information on the RTP Media Portal, refer to *MCS 5200 RTP Media Portal Basics, NN10035-111*.

For more information on the RTP Media Portal when in association with a CS 2000 refer to *CVoIP RTP Media Portal Basics, NN10367-111*.

CHS Services

CHS includes the following services:

- [VoIP VPN on page 57](#)
- [MCDN on page 61](#)
- [Centrex IP on page 65](#)
- [Internet Transparency on page 68](#)
- [MCS 5200 to CS 2000 Interworking on page 69](#)
- [SIP interworking on page 73](#)

VoIP VPN

Carrier Hosted Services VoIP VPN is a hosted service that enables carriers to cost effectively manage multiple enterprise voice networks over their managed IP infrastructure.

The following products interwork to the CS 2000 through PRI and H.323:

- CS1000 and CS1000M (Release 4.0)
- Business Communications Manager (BCM) (Releases 3.6 and 3.7)

The following functionality is new to (I)SN08:

- H.323 capacity improvements increase the number of allocatable endpoints per Gateway Controller.
- Media interoperability between H.323 Gateways and Interworking Spectrum Peripheral Module (IW SPM).
 - Supports RTP Portal insertion for H. 323, CICM, and MCS.
 - Supports mid-call OOB DTMF for H.323 and SIP.
 - Handles mid-call SDP renegotiations and exchanges with H.323 and SIP devices.
- RFC 2833 Dual Tone Multifrequency (DTMF) interoperability between VoIP VPN endpoints. This functionality provides a common method of DTMF transport across SIP and H.323 gateways.
- Support for 2 Calling Line Identities (2CLI) delivery to an International H.323 terminator. Both the CS 2000 and CS 2000-Compact support 2CLI on H.323 VoIP VPNs.
- Interworking between H. 323 endpoints and the MG 9000 for basic calls, allowing VoIP VPN to interwork with MG 9000 IP lines.

- Interoperability between the CS 2000 H.323 Gatekeeper and the Cisco Call Manager. Includes all applicable CS 2000 VoIP VPN supported endpoints.
- T.38 fax calls between H.323 endpoints residing on gateways within carrier and enterprise networks.

The Carrier Hosted Services VoIP VPN service offers the following benefits:

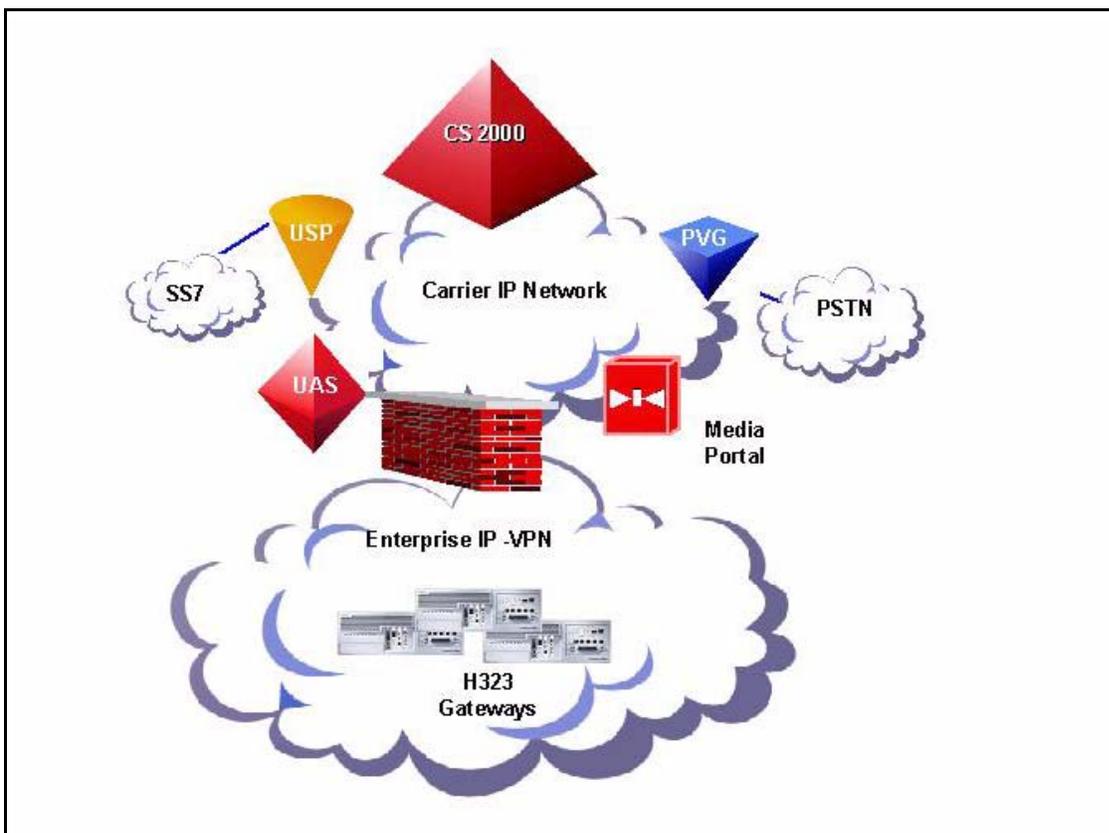
- reduced network connections
- simplified call routing
- seamless connections to remote locations
- streamlined network management
- increased network services and CPE revenue for carrier customers
- cost savings to enterprise customers through converged access and long-distance bypass

This service is available on the CS 2000 and the Communication Server 2000 - Compact (CS 2000 - Compact).

The Carrier Hosted Services VoIP VPN service combines the extensive voice VPN translations capabilities of the communication servers with H.323 multi-vendor IP PBX networking. With VoIP VPN, rather than having a mesh of links, only one integrated access link is required to each site, thereby collapsing multiple voice networks onto a single, managed packet infrastructure. All services – local, long distance, intranet, and Internet – are delivered over this one link. Additional leased lines and data changes are no longer required at the other sites.

The following figure shows a high-level view of the network architecture for the Carrier Hosted Services VoIP VPN program.

Carrier Hosted Services VoIP VPN architecture



VoIP VPN deployment

The Carrier Hosted Services VoIP VPN program is deployed in two primary applications:

- Single site access for small-to-medium enterprises, which supports integrated access and support of existing CPE.
- Large enterprise multi-site hybrid VPN, which eliminates leased lines and provides a centrally managed dial plan.

H.323 access to VoIP VPN

H.323 access enables the direct H.323 connectivity of customer sites to the VoIP VPN service.

A range of IP-enabled PBXs, IP PBXs, and gateways are supported including

- BCM Releases 3.6 and 3.7
- CS1000/CS1000M Release 3.0
- third-party gateways

H.323 is the most widely deployed VoIP protocol used in enterprise networks today. This feature enables carriers to cost-effectively extend the reach of the VoIP VPN service offering to H.323-based CPE. IP access also enables carriers to bundle multiple voice and data services over a single converged access path.

international H.323 DPNSS tunneling on CS 2000

The DPNSS signaling from the Westell H.323 DPNSS interface is tunneled transparently by the CS2000 to either of the following:

- another DPNSS PBX connected to the CS2K via a Westell H.323 gateway
- IBN7 trunks supporting the existing Nortel proprietary DPNSS feature transparency capability (DFT).

Limitations and restrictions

- This feature provides VPN transit functionalities for the hosted CS 2000. Therefore, any originating or end-node functionalities that relate to DPNSS features are not supported by the host CS 2000. Any support for originating/terminating DFT as end-node functionalities on CS 2000 IAD gateway lines, require DFT (IBN7 TDM/SIP-T) looparounds.
- Direct BTUP interworking for PSTN breakout calls from the CS 2000 are not supported. DFT looparounds will be required for such calls.
- ROP functionality as required by the transit exchange is supported. However, the ROP billing as a DPNSS feature is not supported over the QSIG trunk.
- Billing records in general will be based on the incoming QSIG trunk rather than the DPNSS.
- Data calls are not supported by Westell gateway.
- Name Display service is not supported (as currently is not supported in DMS100 for DPNSS).
- Tables TMTMAP and FAILMSG are not supported by QSIG. This results in not being able to provide flexible treatments and cause mapping in IBN7/ QSIG interworking call scenarios. This implies that we can not use table TMTCTL in conjunction with table TMTMAP to be able to flexibly apply announcements locally by the CS2K, while letting the tones to be applied remotely by the PABX based on specific causes. This restriction together with H.323 gateway limitation in applying tones such as user_busy, means that we should always set the AUDTRMT option in table LTDATA to 'N'.
- Westell gateway (together with other current H.323 gateways) can not be made to apply RingBack tone after the Connect. This means

for certain services which rely on CS2K to apply the RingBack tone after connection, the CS2K will not be able to apply the tone.

For a list of supported DPNSS/Centrex features, refer to [Features and services on page 109](#):

For a complete listing of all documentation associated with Carrier Hosted Services VoIP VPN refer to [Where to get customer documentation on page 146](#)

In particular, refer to the following sections:

- [BCM on page 147](#)
- [CS1000 and CS 1000M on page 147](#)
- [Meridian 1 on page 148](#)
- [MCS 5100 on page 148](#)

MCDN

CHS introduces enhanced Meridian customer defined networking (MCDN) support:

- transparent tunneling of MCDN information between multiple CS 2000s with Communication Server 1000M/Business Communication Managers (BCM) connected at either end
- interworking support that allows the CS 2000 to terminate MCDN functionality and interwork with Centrex lines, providing enhanced support for Enterprises with users split between IP-PBXs, integrated business network (IBN) Centrex lines, and Centrex IP lines of the CICM

North American H.323 for Networked MCDN services

H.323 can be configured to allow interworking of Meridian Customer Defined Network (MCDN) based PBXs with certain hosted NA CS2K centrex lines for use within the Enterprise network. The specific set of MCDN services are based on the following network configurations:

- Interworking on a per nodal basis. These specific set of MCDN services are supported and interworked over a PRIH.323 Trunk facility between either an S1000 or BCM, and a hosted centrex line on a NA CS2K switch.
- Interworking on a per inter-Call Server basis. These specific set of MCDN services are supported and interworked over a SIP-T Trunk facility between either a S1000 or BCM, and a hosted centrex line on a NA CS2K switch.

The following H.323 interworkings are supported for MCDN services:

- H.323 GW (BCM) <--> H.248 GW (CICM, P-phone)
- H.323 GW (BCM) <--> MGCP GW (Mediatrix, IBN lines)
- H.323 GW (S1000 and S1000M) <--> H.248 GW (CICM, P-phone)
- H.323 GW (S1000 and S1000M) <--> MGCP GW (Mediatrix, IBN lines)

The following supported MCDN services are listed in the [Features and services on page 109](#):

- BCM interworking to CICM and Mediatrix for nodal calls and through SIP-T
- S1000 and S1000M interworking to CICM and Mediatrix for nodal calls and through SIP-T

For provisioning information, refer to *Provisioning the trunk group and trunks for an H.323 gateway, CS 2000 Configuration Management, NN10324-511*.

Pre-requisites

An H.323 Nortel North American (NTNA) PRI Trunk, referred to as a PRIH.323, is utilized to connect a GWC with an H.323 profile to the CS 2000 on a NA CM load.

SIP-T is defined as an ANSI ISUP Trunk facility which contains Tunneled MCDN data.

Limitations and Restrictions

The limitations and restrictions for NA H.323 support for Networked MCDN services are as follows:

- A subset of MCDN services are supported by this feature.
For supported MCDN services, refer to [Features and services on page 109](#).
- Line side development (P-phone, IBN lines) is not part of this feature.
- Development on the H.323 agents (BCM, S1000) is not part of this feature.
- MCDN Services which are not supported either by an H.323 agent or the CS 2000 CICM or Mediatrix line agent, will not be supported by this feature.
- Tunneling of MCDN data between Enterprises is outside of the scope of this feature.

- For Calling Name and Number delivery, the appropriate feature must be provisioned against the subscriber (i.e., CND - Calling Number Delivery, CNAMD - Calling Name Delivery, etc.).
- In the CICM (CS2K) to S1000M direction, only private Numbering Plan Indication (NPI) calls will contain this privately built MCDN tunneled data - public calls will not contain MCDN tunneled data.
In the CICM (CS2K) to S1000M direction, private NPI with Local Type of Number (TON) is coded as an UIPE ESN CDP TON.
- CS2K Core Calling Name Delivery remains unchanged by this activity to either line agents or trunk agents; therefore, existing functionalities, restrictions or limitations of Calling Name Delivery remain applicable.

International H.323 support for MCDN services

International H.323 support of Meridian Customer Defined Network (MCDN) Services includes:

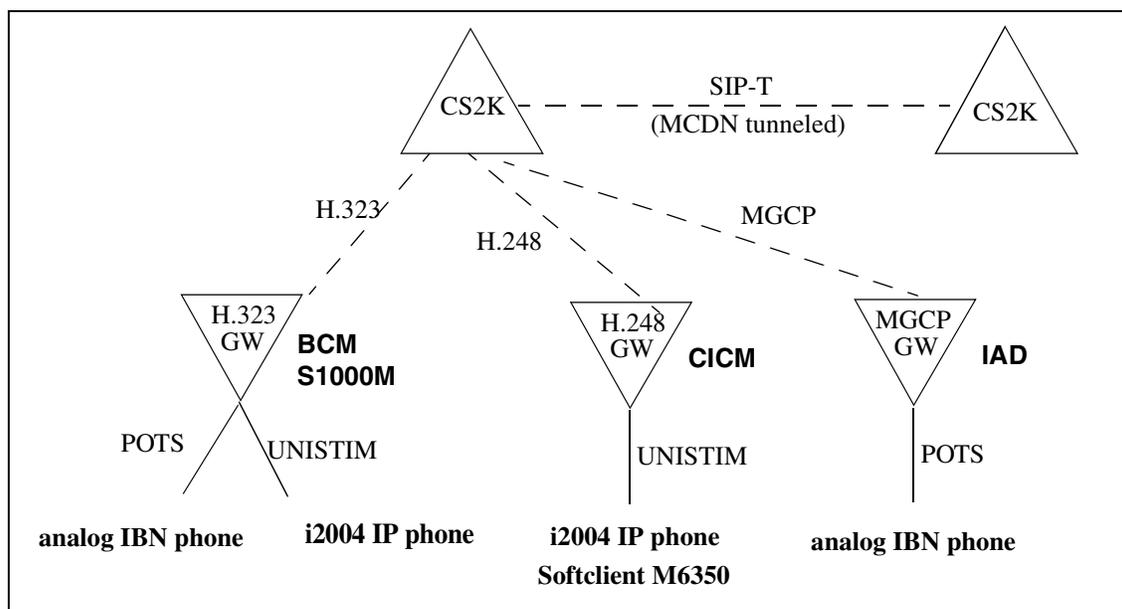
- MCDN interworking on nodal calls and via SIP-T (ETSI ISUP V2+ QFT) for inter-Call Server calls.
- MCDN based service interworking between the S1000M or BCM (H.323 GWs) on one call leg and CICM (H.248 GW) or Mediatix IAD (MGCP GW) on the other call leg.
- MCDN services which are supported on P-phone agents or IBN lines agents.
- MCDN based services for the CS2000 international load.

MCDN interworking includes:

- H.323 GW (BCM) <--> H.248 GW (CICM, P-phone)
- H.323 GW (BCM) <--> MGCP GW (IBN lines)
- H.323 GW (S1000M) <--> H.248 GW (CICM, P-phone)
- H.323 GW (S1000M) <--> MGCP GW (IBN lines)

The following figure displays the VoIP network configuration for H.323 support for MCDN services.

Associated network drawing



Limitations and Restrictions

The limitations and restrictions for H.323 support for Networked MCDN services are as follows:

- A subset of MCDN services are supported by this feature.
For supported MCDN services, refer to [Features and services on page 109](#).
- Interworking between call servers is solely achieved via SIP-T (ETSI ISUP v2+) with QFT (QSIG Feature Transparency) activated. No other interworking types between call servers are supported for this feature.
- Tunneling of MCDN data between enterprises (different customer groups) is out of scope of this feature.
- Limitation on Connected Number Delivery: In the software load of the S1000M Gateway and BCM gateways, which this feature will be based upon, no functionality exists to transport the Connected Number Information Element of H.323 call control messages in the non-private portion of the messages. Therefore, this functionality is not supported for the interworkings between Mediatrix and S1000M gateways, and between Mediatrix and BCM gateways.
- Limitation on Called Number Delivery: In the software load of the BCM gateway, which this feature will be based upon, no functionality exists to transport the Original Called Number Information Element of H.323 call control messages in the

non-private portion of the messages. Therefore, this functionality is not supported for the interworkings between Mediatrix and BCM gateways.

For a complete list of MCDN services, refer to [Features and services on page 109](#).

Centrex IP

The Centrex IP Client Manager (CICM) uses VoIP technology to deliver Centrex capabilities to users connected to an IP network.

The CICM provides:

- the interface between the Centrex feature set and an IP network
- transcoded voice between IP data from the client network and PCM data from the XPM
- connectivity with the CS 2000 via H.248
- CICM support on the SAM21
- multiple IP-VPN and Network Address Translation (NAT)/firewall traversal
- multiple NAT domain support using virtual gateways
- codec negotiation based on audio profile
- Dual Node Redundancy

The CICM is an integral component of the Carrier Hosted Services. Functionally, the CICM refers to all the CICM processors on a SAM21 chassis associated with a single CS 2000. The CICM processors used in the SAM21 are faster and provide three times the density of the older 5365 cards used in the SAM16.

CICM and the CICM EM reside on blades in the SAM21 chassis.

- CICM resides on a pair of high-density Motorola 5385 processors.
- CICM EM resides on a single processor.

Moving CICM to the SAM21 chassis consolidates the platform so the CICM and CICM-EM can co-reside on the SAM 21 along with the Gateway Controller (GWC) and H.323 interface cards. The former SAM16 frame is no longer required to support the CICM, and that entire frame is removed from the following list of (i)SN07 CICM hardware. This elimination of the SAM 16 hardware reduces cost and results in a substantial improvement in the CICM footprint.

The CICM functions as a terminal server or signaling gateway in a Carrier VoIP network and performs the following functions:

- interprets the client terminal Unified Network IP Stimulus (UNIStim) messaging
- associates the information with a userid
- forwards the message to the communication server

CICM does not transport media in the Carrier VoIP market.

- If the end points are in the same IP VPN or network address domain, the CS 2000 GWC routes the media directly between the two endpoints.
- If the end points are in different IP VPNs or network address domains, a media proxy routes the media.

The CICM manager software performs the following functions:

- CICM configuration and connection monitoring through a web-based interface
- support of remote terminal telnet access
- user profiling (user ID, password, audio profile, language)
- maintenance of central database of configuration data
- CICM gateway backup
- CICM software upgrades

Centrex services through CICM

The CICM product allows for transparent access to 200-plus, Centrex-featured voice services.

The CICM offers enhanced capabilities over the standard Centrex.

- **Mobility.** A user can log on and access Centrex services from any location that has IP connectivity with the CICM.
- **Choice of client.** Users can choose between the m6350 SoftClient or four versions of the physical etherset: the i2001, i2002, i2004 or i2033. An etherset is recommended for a user based at one location, and the SoftClient is recommended for mobile users to access from a variety of locations.
- **Hot desking.** A user can log into any terminal connected to the CICM. This provides flexibility and the avoidance of costs normally associated with intra-site staff moves.
- **Selective CICM login.** The selective CICM login feature lets you log into a selected CICM from a group of CICMs, and log into any

terminal connected to the selected CICM. Enterprise Profiles allow the administrator to define groupings of CICMs and associated users.

- Integration of CICM and PC desktop software. An interface between the terminal and the PC software allows for CICM and PC integration. For example, within Microsoft's Outlook PIM, the user can set up a call by clicking on the person's contact details.
- Address book for contact numbers.
- A list of recent incoming and outgoing calls.
- Function key lamp cache. On a regular Meridian Business Set (MBS), unplugging the set loses all lamp states. On a CICM client, the status of all function key lamps is cached in the CICM on a per-line basis. When a previously disconnected client is reconnected, the lamp status is correct for features such as call forwarding, message waiting, etc.

CICM capacity

The CICM has the following capacity limits:

- For each CICM Motorola CPN 5385 resource card pair:
 - 3,069 subscriber line -provisioning capacity
 - 21,600 busy hour half-call attempts (BHHCA)
 - 3,069 active calls
- The CICM is scalable by adding more CICM processors
- One pair of CICM-EM cards is needed for each CS 2000
 - Able to support up to 100 CICM resource pair cards
- Per GWC resource card pair:
 - 6,400 subscriber line-provisioning capacity
 - 38,000 BHHCA

For more information, refer to the CICM documentation suite in the CHS collection in Helmsman Express. The CICM documents are listed in [CICM documentation on page 148](#)

Internet Transparency

Internet Transparency and security-related products include the following capabilities:

- Multiple IP-VPN and NAT/firewall traversal
 - Lawful Intercept (LI)
- Emergency 911 (E911) enhanced support on the Enterprise network

In CHS SN06, Media Proxies were datafilled on every Gateway Controller (GWC).

In CHS (I)SN07, Media Proxies are datafilled on line GWCs with NAT'd lines and SIP-T GWCs.

Internet Transparency and security-related products

The Internet Transparency and security products deliver the following capabilities:

- Multiple IP VPN
- Enhanced support for emergency services on an Enterprise network.
- Internet Transparency, in which the solution can traverse any firewall and NAT devices without the need to add additional firewalls or NAT devices on the customer's network. Internet Transparency involves the use of a media proxy on the public side of a NAT in the service provider premise to detect the public side IP address and transport port information for RTP and RTCP flows on an individual call basis.
- Lawful Intercept (LI) consists of electronic surveillances that meet mandatory market requirements across all markets. The Communications Assistance for Law Enforcements Act (CALEA) requires that telecommunications equipment manufacturers provide operating companies with the capability to support lawfully authorized electronic surveillances (LAES) activity. Electronic surveillance refers to the mechanism used to access intercepted call content and call data from a switch-based subject, and deliver this information to one or more law enforcement agencies (LEA).

For more information, refer to the *North American Lawful Intercept Product and Technology Fundamentals, NN10190-113*

MCS 5200 to CS 2000 Interworking

Multimedia Communication Server 5200 (MCS) to CS 2000 Interworking includes the following capabilities:

- MCS 5200 4.0 interworking in (I)SN08.
- North American market support for Converged Desktop between the MCS 5200 and CS 2000 via IN-to-SIP signaling gateway:
 - Personal agent
 - Multimedia collaboration
 - Click to call to chosen device
 - Origination from telephone

MCS 5200 to CS 2000 interworking supports the CS 2000 and various H.323 gateways controlled by a CS 2000, and the various SIP clients controlled by the MCS 5200 system. The MCS 5200 is part of a carrier hosted voice virtual private network (VPN). The CS 2000 and MCS 5200 are interconnected through a SIP trunk.

Interoperability between MCS hosted users and CS 2000-hosted H.323 gateways is supported in the same or different Enterprise/IP address spaces.

In order to create a VPN spanning the CS 2000 and the MCS 5200, each customer group on the CS 2000 is mapped onto one domain on the MCS 5200. For each VoIP VPN/domain, there is exactly one SIP trunk between the CS 2000 and the MCS. Several VoIP VPNs may exist in a configuration consisting of a CS 2000 and an MCS.

The VPN support comprises a set of supplementary services and a common dial plan. The dial plan typically consists of a concatenation of a location code and an extension. The SIP trunk is assigned a specific location code.

This feature supports G.711 and G.729 codecs at packetization rates of 10 and 20 ms.

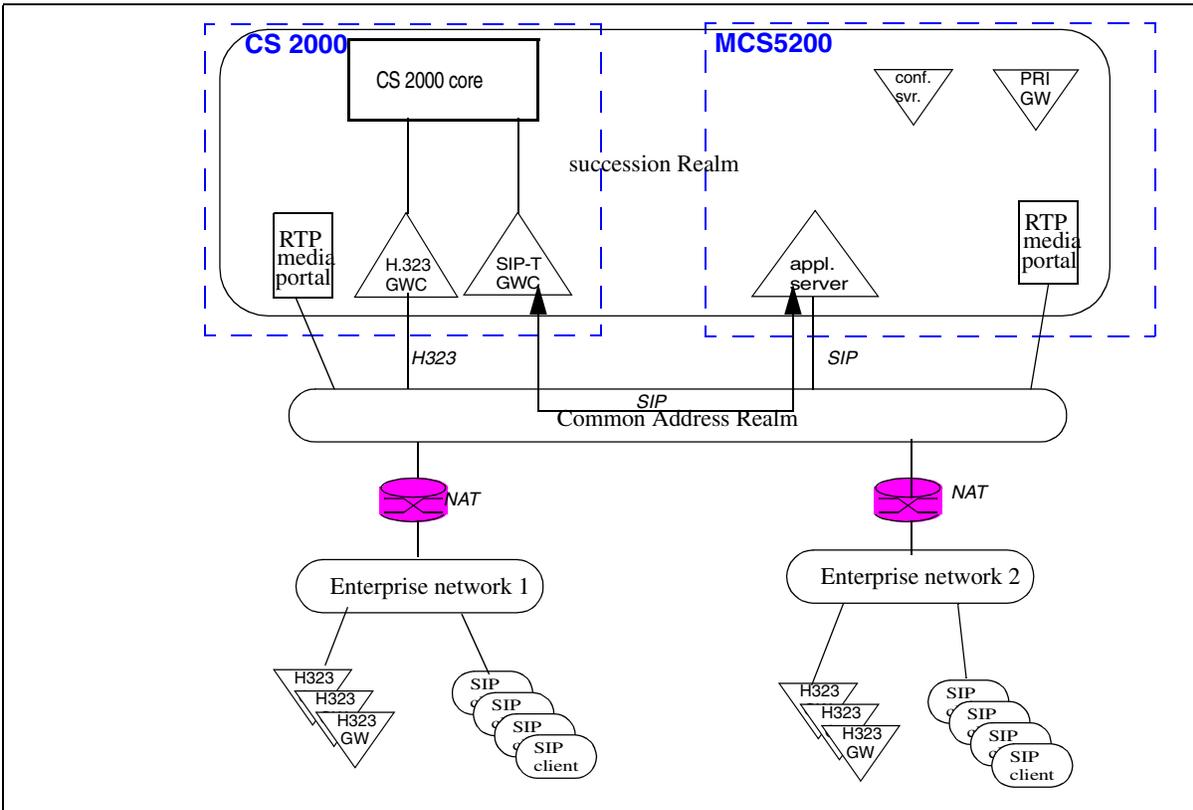
The following MCS 5200 clients are supported:

- PC client
- Web client
- Nortel IP Phone 2004 and IP Phone 2002 internet telephones

The interworking configuration follows:

Note: For the MCS 5200 configuration, the PRI gateway is supported in the international market only.

H.323 to MCS 5200 interworking configuration



This activity supports VPN networks with the following topology:

- VPNs hosted by one CS 2000
- VPNs hosted by several CS 2000 interconnected by a SIP-T trunk

On the CS 2000, the following H.323 gateways are supported:

- S1000
- S1000M
- BCM

- Westell (international market only)
 - liQ2031 supporting 1 E1 with DPNSS
 - ilQ2032 supporting 2 E1 with DPNSS
- Cisco internetworking operating system (IOS) gateways (GW)

Media portal insertion

The media portal must be inserted on both the MCS 5200 and the CS 2000 independent of whether the MCS 5200 clients and the H.323 gateway reside in the same enterprise network.

For calls that originate and terminate in the enterprise network - regardless of whether it is the same or a different enterprise network - the media portals will always perform a public/public NAT; that is, the Media streams between the MCS and the CS 2000 media portal are always routed through the common address realm, and not through the succession realm.

Supplementary services

Support for the following supplementary services is available from the H.323 gateways and SIP clients.

- Call Forward

You can forward your calls to other locations.

- Conference

The Ad Hoc audio conferencing service is provided through the MAS which resides in the MCS configuration. (Meet Me audio conferencing is not supported.)

Note: Ad Hoc audio conferencing is provided through a UAS-based conference server (international only).

- Call Transfer

You can transfer an active call without talking to the person you are transferring the call to (blind transfer), or you can consult with the person who will receive your transferred call (consult transfer).

- Redirect

You can enter an address where the call will be redirected.

- Decline

The Decline Call feature releases the call.

- Caller ID

This feature provides the caller identification number or caller name.

- **Hotline**

You can configure an Nortel IP Phone 2002 or IP Phone 2004 Internet Telephone such that a specific hotline number is called when the subscribed user that is registered on the IP Phone 2002 or IP Phone 2004 Internet Telephone goes off hook.

Refer to the MCS 5200 documentation for more information, in particular:

- *Provisioning Client User Guide, NN10043-113*
- *IP Phone 2004 Internet Telephone User Guide, NN10042-113*
- *Multimedia PC Client User Guide, NN10041-113*

Support to DTMF

Exchange of out-of-band dual-tone multifrequency (DTMF) is not possible with the current implementation.

H.323 does not send inband DTMF tones.

Software requirements or dependencies

The feature depends on the following software version of the different gateways:

- S1000: release 3.5 (SSE-2.11.03)
- S1000M: release 3.5 (SSE-2.11.03)
- BCM: release 3.6
- Westell liQ 2031, IPH-DP 1-6-11, supporting 1 E1 with DPNSS (international market only)
- Westell liQ 2032, IPH-DP 1-6-11, supporting 2 E1 with DPNSS (international market only)
- Cisco routers 3600/3725 (Cisco IOS GW): releases 12.2 and 12.3
- Cisco router 2600 (Cisco IOS GW): release 12.2
- MCS 5200: release 3.0

Limitations and restrictions

Calls originated by an MCS client that terminates on an H323 client that is not connected to the same CS 2000 as the MCS cannot be treated as private calls; that is, the private information will be lost. This limitation is caused by the private information not being tunnelled through the SIP trunk between the different call servers.

Support for MCS SIP clients as subscribers in a CS 2000 hosted VPN assumes the MCS clients will be treated as a single network class of service (NCOS). Specifically, the MCS clients will be treated as the NCOS assigned to the integrated business network (IBN) SIP trunk.

Support for the MCS hosted users in the same Enterprise/IP address space as the H.323 gateways is based on the current MCS implementation that both the MCS and the CS 2000 would insert RTP media portals on both the MCS 5200 and the CS 2000.

This feature is restricted by the availability of supplementary services specified in the section [Supplementary services on page 71](#)

The virtual private network (VPN) is realized by a universal dialing plan consisting of a location code and extension, for example: 740 1234.

The Decline/Reject reason text transmitted by the MCS client is not transported across the CS 2000 to the H.323 client.

The conference server and PRI gateway in the international market are UAS based.

The conference server in the north american market is the Media Application Server (MAS).

The PRI gateway is not supported in the north american market.

For the Caller ID supplementary service, the calling name is not provided for calls originated by MCS.

SIP interworking

SIP interworking includes the following capabilities:

- integration ready for third-party SIP application servers
- integration ready for third-party SIP call servers
- Converged Desktop functionality through SIP for CS2000

The Session Server uses SIP-T, an extension of the Session Initiation Protocol (SIP) that allows SIP to be used to facilitate the interconnection of the Public Switched Telephone Network (PSTN) with packet networks. SIP-T encapsulates the ISDN User Part (ISUP) messages in the SIP messages and translates ISUP information into the SIP header for routing purposes.

For more information about SIP-T in (I)SN08, refer to the documents on the component, [Session Server on page 149](#)

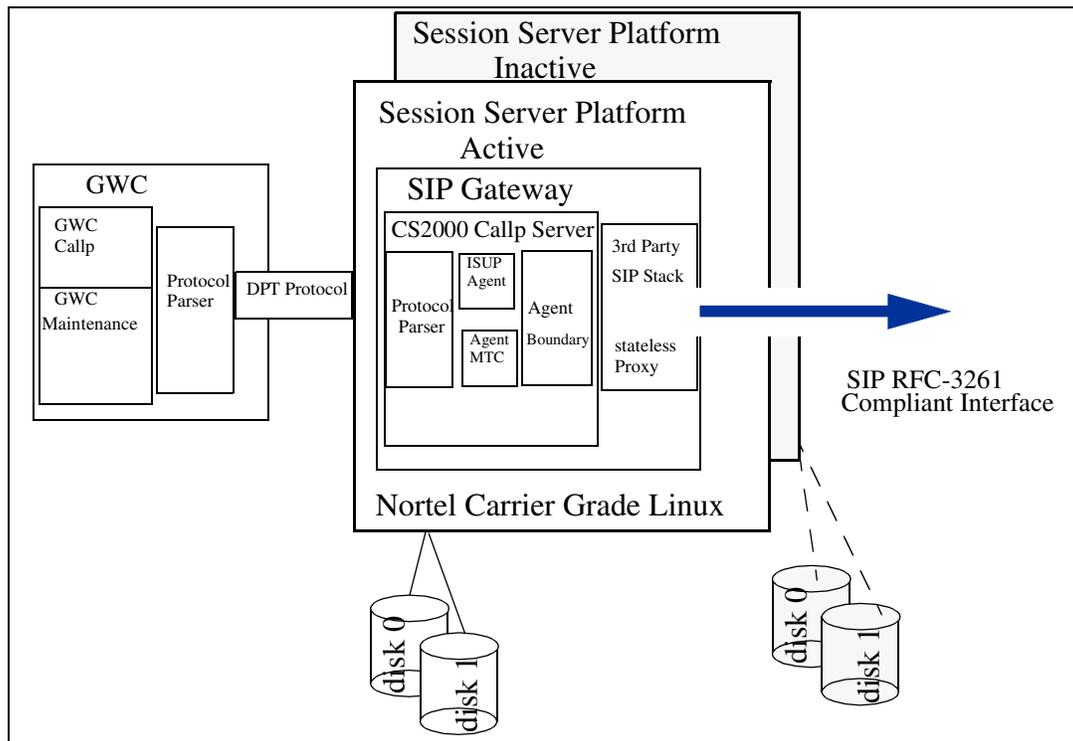
Session Server

The Session Server is a high-capacity, carrier-grade platform introduced in SN07. The Session Server is part of the CS 2000 or CS 2000 Compact and serves as a platform for the following applications:

- SIP Gateway Application
- Policy Controller

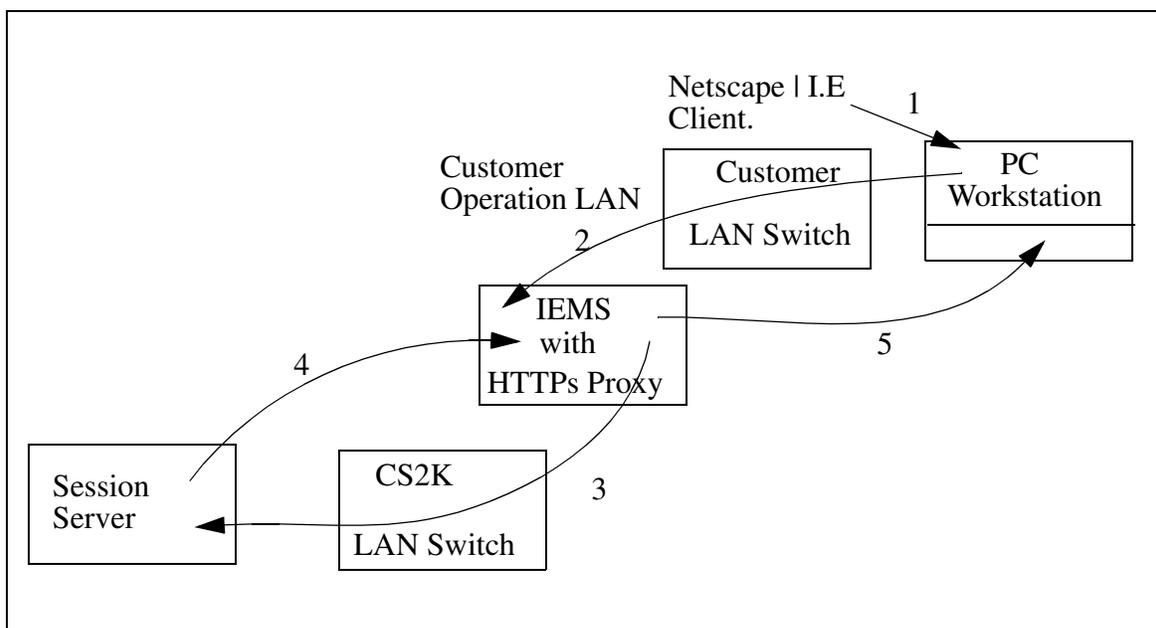
The architecture for the Session Server consists of a mated pair of Services Application Module- eXtreme Thin Servers (SAM-XTS) with a configuration similar to that of a gateway controller. Each unit is interconnected through a gigabit ethernet link as shown in the [Mated pair Session Server on page 74](#). Each server provides processor capacity, local disk storage, and high-bandwidth network connectivity.

Mated pair Session Server



The Session Server can be configured to use the Integrated Element Manager System (IEMS) between the customer operation LAN and the Call Server 2000(CS2K) LAN or it can be configured without the IEMS. The following figure shows a proposed configuration with IEMS, where an Hypertext Transfer Protocol (HTTP) proxy is configured on the IEMS to redirect the Netscape/Internet Explorer browser to the Session Server.

Configure Session Server with IEMS



An overview of the configuration steps include:

- User points the browser to web link on the IEMS.
- IEMS invokes the HTTPs proxy.
- The HTTPs proxy on the IEMS redirects the link to the Session Server.
- Session Server replies back to IEMS.
- IEMS responds to user request.

SIP Gateway Application

The SIP Gateway Application supports call processing interoperability between the communication server, third-party call server, and application servers. Support includes the following functionality:

- set-up and take-down of SIP calls
- messaging to the DPT Gateway Controllers
- Messaging to remote SIP servers

The Session Server captures and stores all SIP messages related to call processing, including protocol events.

In (I)SN08, The Session Server pegs OM counts for the SIP Gateway application on a more granular basis, such as per SIP link, to provide more details on the operations and performance of the Session Server

For more information about the Session Server, refer to the documents located in the CHS Solution collection in Helmsman Express. For a listing of documents, refer to [Session Server on page 149](#).

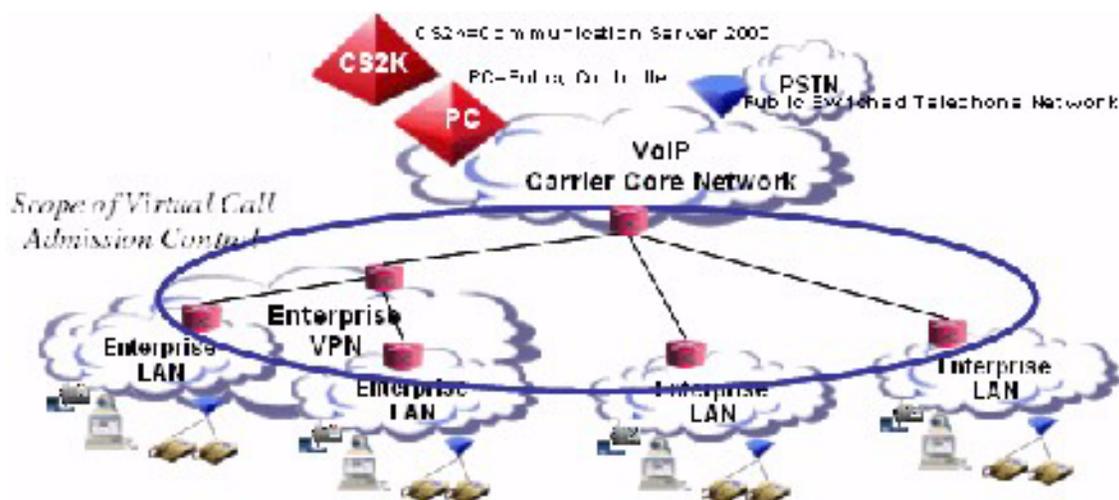
Policy Controller

The Policy Controller (PC) is a software application that resides on the Session Server. The Policy Controller provides network admission control for the clients and devices served from the CS2000 in CHS.

The focus of the Policy Controller is enforcement of resource control plane policies such as QoS policies in CHS. The Policy Controller combines awareness of subscribers with awareness of network resources to assure reliable network handling of media flows. Policy-based call admission control decisions in the Policy Controller take into account the requester's resource reservation request and available capacity to determine whether or not to accept the request.

The Policy Controller application provides facilities for general application maintenance and network topology provisioning.

Policy Controller architecture



In (I)SN08, VCAC Bandwidth Policy is the only policy supported. This policy carries out network resource reservation functions.

The Policy Controller application applies the default policy to all requests for network resources to enforce call admission control. Resource requests can be in the form of a flow specification or an amount of bandwidth requested. The VCAC Bandwidth usage calculations are used to monitor the bandwidth usage status, and ensure there are enough resources for call requests.

The Policy Controller application functions as its own element manager. Provisioning and maintenance activities for a Policy Controller take place on the Policy Controller itself. The provision framework provides a web based interface to configure Policy Controller system parameters, provision network topology, perform application management, and display Policy Controller-specific OMs, alarms, and logs.

Limitations and Restrictions

The (I)SN08 deployment of the Policy Controller has the following limitations:

- Each Policy Controller unit only supports one CS 2000.
- If migrating from Basic VCAC to Network VCAC, initial commissioning requires a transfer of topology data from the SESM. The transfer requires the customer to perform the following tasks:
 - Query the data from the OSS to the SESM
 - Add the data to the Policy Controller
- The base platform does not support centralized authentication of passwords.
- The Policy Controller application cannot co-run with other applications that reside on the Session Server.

VCAC

Virtual Call Admissions Control (VCAC) is a Quality of Service (QoS) mechanism that allows the Communication Server 2000 (CS 2000) to cancel post-dial, pre-ringing calls that would overload a segment of the packet network. VCAC is used to provide Network Resource Based Admission Control by setting service class bandwidth limits based on the bandwidth available on the subscriber's access link. VCAC is virtual because it does not require interaction with real network elements. It models network elements and tracks the amount of bandwidth consumed by the application flows. When the model indicates that bandwidth is fully utilized and any additional flows would exceed link capacities, no additional flows are authorized.

VCAC depends on a logical model of the packet network. This logical model starts with the Service Provider's core packet network and points

of bandwidth concentration. These points could, for example, be customer enterprises that are made up of a collection of sites or a regional broadband aggregation point. These sites are connected by a mix of Limited Bandwidth Links (LBLs) and NATs. The VoIP GWs and, hence, the lines are located within the sites in each enterprise.

In (I)SN08, the Policy Controller extends the VCAC functionality on the CS 2000 Gateway Controller across the network. A network-wide VCAC allows the bandwidth resource through-links in an access network to be shared by all gateways and endpoints on a CS 2000. Network VCAC removes the critical restrictions on deploying VCAC on sites with a mix of gateway types. Network VCAC also removes the limitation of an LBL and the gateway behind it having to be on the same GWC.

Note: If the Policy Controller application is not available or the TCP connection between the GWC and the Policy Controller is down, the call will be allowed to go through without doing any checks on bandwidth availability. Should Policy Controller topology not know about any particular link it is queried on, it will reply with an error and the GWC allows the call to proceed without any QoS.

Network VCAC also supports composite middleboxes (a middlebox that is a NAT and LBL at the same time).

The SOC option must be in the ON state for Network VCAC to be usable. For information on enabling SOC, see [Enabling the VCAC SOC option on the CM on page 102](#). For information on upgrading, see...

Limitations and Restrictions

The limitations and restrictions for Network VCAC are as follows:

- Network VCAC supports a single CS 2000. It does not support multiple CS 2000s or MCS.
- A maximum of five network links between a GW and the service provider's core network.
- Only uses the negotiated values for a call.
- Requires that voice traffic is prioritized over data traffic. VCAC does not model voice and non-PC controlled data traffic on the same LBL. Careful modeling of the logical network is required.
- Interactions with codec negotiation. In a network configured to use G729 as the preferred codec and G711 as the default codec, the originator offers a list of codecs to the terminator who chooses which one the call will use. Initially, the NVCAC application assumes the worst case (G711) at the originator until the negotiated SDP is

returned by the terminator. However, this means that it is not always possible to get the expected number of G729 on a link. This is difficult to detect as it is difficult to guarantee that all calls will negotiate G729.

Limitations and Restrictions

The following limitations are new to (I)SN08:

- CICM Active Call Failover
- VCAC
- AOC over H.323

CICM Active Call Failover limitations and restrictions

The following limitations apply to the CICM Active Call Failover functionality:

- During the switch of activity of the VMG component, only stable calls are guaranteed to survive. Unstable calls may or may not survive.
- Performing a stop or restart of a node from the element manager will not automatically initiate a SWACT even if one may be desirable. It is the operator's responsibility to ensure the node is in the desired state before performing the stop. The element manager will however provide warnings of proceeding with any potentially service affecting actions.
- Once initiated, a SWACT cannot be cancelled despite its possibly long duration. To return the system to its original pre-SWACT state, a second SWACT must be carried out once the first one completes.
- The only supported upgrade path to 8.10 is from 7.20 for both the CICM and EM. The 8.10 Element Manager may be used to manage SN06.2, SN07, and SN08 CICMs.
- With 8.10, the CICM ceases to support a load-sharing mode. Active Call Failover's goal is to shift the role of the secondary node from providing a load-sharing capability to providing full failover redundancy.
- Because of the amount of processing work involved in the terminal recovery process, some real-time impact on call processing may arise during a SWACT.
- The terminal recovery process does not currently prioritize terminals in active calls over idle terminals. The recovery process aims to recover all terminals sequentially and without prejudice. However, the recovery process does give immediate priority to a terminal that experiences user interaction.
- During a SWACT, incoming events (state change requests) from the GWC will not be immediately presented to a non recovered

terminal. Only at the point that the terminal is recovered is it presented the updates.

- In the rare case that the new master node should experience an outage while a switch of activity is in progress, it cannot be guaranteed that some terminals won't reboot and that calls won't be lost as a result.

VCAC limitations and restrictions

The VCAC architecture has some provisioning limits that are enforced by the provisioning system. These are:

- There is a maximum of 5 network links between a GW and the Service Provider's core network.
- VCAC only uses the negotiated values for a call. This means that fax and modem upspeaking to G711 from G729 will not be modeled. Similarly, T.38 fax calls will not change the modeled bandwidth for the call.
- There is a requirement that voice traffic is prioritized over the data traffic. VCAC does not model voice and non-PC controlled data traffic on the same LBL. This has to be done by careful modeling of the logical network as part of the system engineering.

AOC over H.323 limitations and restrictions

The following limitations apply to the AOC over H.323 functionality.

- Sending of AOC charge information as currency units is not supported for H.323 QSIG trunks at this time.
- AOC calculation based on the charging interval introduced with A00002625 is not supported.
- A delta may exist between the number of charge units saved in the AMA record by the CM feature controlled by SOC NSUP0023 and the number of charge units provided by the AOC metering counter in the GWC. This is due to charge interval based calculation done in the CM.
- The GW calculation of the AOC does not influence or change AMA records extension introduced with A00002638. There are no direct interactions between the AMA billing system and the AOC functionality in the GWC.
- AOC on H.323 QSIG is only supported for bearer calls. AOC on H.323 QSIG for non-bearer calls is not supported. Facility IEs with AOC operations for these calls are transparently passed through the CS2000.
- AOC-S (AOC at call setup) is not supported.

- Provisioning of AOC can only be per trunk group and per GWC. AOC request is always on a per call basis.
- Out of the support AOC modes, only those will be delivered which are requested and provisioned at the same time.
- Only connection-oriented charging information is transmitted to the user (charges for supplementary services are not included).
- In case no system resources are available in the GWC, a FACILITY message with a Facility IE coded “chargeNot Available” is sent towards the originating H.323 gateway. If the AOCREL boolean is set in table TRKOPTS, the call is released; otherwise, it is not released.
- Race condition: If a call has AOC-D activated, the originating H.323 gateway might receive a FACILITY message after it sent out a ‘getFinalCharge’ request. This message should not cause an erroneous charge display because it will be received before the RELEASE COMPLETE message with the final charge.
- The feature is supported over GWC Warm Swacts. No errors are expected for Swacts with both units InSv. If the inactive unit is RTS’d and then a Swact happens, there can be errors for the calls that were in talking state at RTS.
- The calculation of the charging rate time interval can produce a result which is not an exact multiple of 100 ms. The result is therefore rounded up to the next 0.1 second multiple.
- Basic Service discounts are not supported on H.323 QSIG because there is not formal definition of Basic Service for H.323 QSIG, even though Bearer Capability and High Layer Compatibility are both defined. This means that table AOCBSDSC will not be used by AOC on H.323 QSIG.
- When changes are done in the table SERVINV, these are not dynamically reported to the GWC. After adding the AOC option, the GWC has to be double swacted in order for the changes to take effect.
- The SESM interface for table SERVINV does not support the AOC option. This option has to be manually added to the table SERVINV.
- The currency name can only consist of up to 10 capital letters (no lower case and blanks supported).
- Currency name changes affect calls in progress as well as new calls.
- It is possible to define only 16 currency names and 16 currency units conversion factor per Call Server.

- A conversion factor change does not affect calls in progress; it only affects calls established after the changes.
- AOC charge requests arriving at the CS2000 after CONNECT are always rejected by the CS2000. This means that no AOC service will be provided for any charge requests received after CoNNECT.
- According to the AOC specification it does not make sense to send more than one AOC APDU per message. If an incoming message or Facility IE contains more AOC InvokePDUs, only the first APDU per message is considered. The remaining APDUs are passed through towards the terminating party.
- If an AOC charge request is received in a FACILITY message during the overlap sending phase and before enough digits were received to route, the following situation may lead to failure to provide the service: the reception of the remaining digits necessary to find a route takes longer than 15 seconds. The reason is timer T1 >= 15 seconds running in the originating PINX, waiting for a reply to the request. This timer may time out, because CS2000 can send the reply only when it found the route. As a result, the PINX will report 'notAvailable' to the user and ignore the AOC information received from CS2000.
- Table TRKOPTS, AOC option, AOCREL = Yes datafill does not have an effect in the following situations (calls are not released):
 - no AOC service is provisioned. but a request is received. The request is replied with 'notAvailable' and the call continues. No CS2000 log is generated.
 - QSIG AOC is provisioned with protocol type KEYPAD or with charging type CHARGING (units). These situations will not even lead to 'notAvailable' replies, they will lead to GWC Swerrs and CS2000 PM189 logs, and no AOC information being sent out.
- The content of the Interpretation APDU in the AOC requests is not checked by CS2000. But the actions taken (which would depend on it) are always according to the AOC standard.
- AOC tariff determination is supported only for the combined CGP/CDP scenario. Support for the French NAOC trunk metering functionality (ITX/TAX messages) is not part of this activity. The

translations table xxHEAD/xxCODE will therefor have to use the keyword (NAOCxxxx).

- The following restrictions already exist for the NAOC tariff database:
 - only 220 operators (16 carrier and 204 reseller) are available per CS2000 node
 - a pool of up to 64K tariffs is available for all operators (carriers and resellers) on a single CS2000 node
 - every carrier can address up to 1022 zones and up to 1022 tariffs. Zones cannot be shared between incompatible zone classes
 - a pool of up to 30 TCOs is available for all operators (carrier and reseller) on a single CS2000 node. TCOs can be shared between operators
 - zoning for international calls is not available on a reseller basis
 - only 10,000 ONDCs can be used for zoning national calls
 - only 511 discounts are available per single CS2000 node
 - all exceptions have to be zones as SERVICE calls
 - up to 4 million SERVICE DNs can be datafilled in table SERVZONE

CS 2000 H.323 limitations and restrictions

The following limitations apply to the CS 2000 H.323 network.

- The CS2K H323 system does not support silence suppression codecs: G.729b or G.729ab, G.723.
- Comfort noise on the CS2K-H.323 system is not supported.
- You can increase capacity without taking the GW OSS out of service. You can also change an IP/port of an H.323 without taking the GW OSS; however, the GW must be behind a NAT.

If the GW is behind the NAT, then the trunks must be Bsy/INB in order to change the capacity or IP address.

- The NAT dynamic mapping time-out in the router should be set high enough to keep those long duration calls active - where the user tries to invoke a feature after talking for a long period of time. (See [Configuration notes on page 91](#).)
- DISA Services:
 - For CS2K H.323, DISA DN hosted off of BCM is NOT supported.
 - When a Carrier Based Line (CICM, MediaTrix, etc.) dials a DISA DN hosted on the CS2K, the DISA DN grants access to a Hosted

- IPPBX Enterprise (that is an S1000) without a work-around requirement of going over the ISUP loop-around first.
 - DISA is NOT supported when a Carrier Based Line (CICM, MediaTrix, etc.) dials a DISA DN hosted on the S1000/S1000M/BCM.
 - When an H.323 IPPBX Line (BCM, S1000, S1000M, etc.) dials a DISA DN hosted on the S1000/S1000M, DISA calls work without any work around.
 - When an H.323 IPPBX Line (BCM, S1000, S1000M, etc.) dials a DISA DN hosted on the CS2K, the call should route to ISUP looparounds (on a Media Gateway 15000) before terminating to DISA.
- To preserve DPNSS VPN network capabilities, calls between the Westell LIQ 2032/2016 GW DPNSS trunks and other agents (line or Media Gateway 15000) must be routed through SIP-T IBN7(DFT) loop-around trunks to preserve DPNSS VPN network capabilities. Also trunks and lines should be in the same network (i.e. the customer groups of the line and trunk have the same NETNAME value) and the CLID option for the line's customer group are set to ONNET to get a CLI display for all VPN calls (or OFFNET if you want CLI display for all calls).
 - Currently, the CS2K H.323 system uses H.450 for DPNSS tunneling only and does not support any H.450 based supplementary features.
 - The TCP keepalive is disabled by default to prevent the active calls after the warm swact from dropping (except when the call involves Cisco 2600 and 3620 GW, in which case the call drops after the warm swact).
 - Inter-working between H.323 and the IW SPM is not supported. A loop-around trunk should be used instead.
 - Slow start calls are supported with G.711 only.
 - The CNDB (Calling Number Delivery Blocking) and CNNB (Calling Name and Number Delivery Blocking) features work with the following datafill.

In Table LTDATA in the H.323 PRI Trunk enter:

```
"Serv Serv Y N Screened Always PRI_IP_PROT H.323"
```

- In order to prevent Glare on the H.323 trunk, trunk selection must be set as either ASEQ or DSEQ. All other trunk types may lead the glare on the H.323 trunks.

- When a call originates from either Cisco GW, BCM, or M1/S1000, where the originator has blocked his calling party number and name, then those fields are NOT delivered to the CS2K marked as 'private'. Instead, those fields are sent to the CS2K marked as 'unavailable', which causes feature ACRJ not to work where a terminator chose to reject all incoming private calls. In order to prevent interworking with E911, lines on the H.323 GWs must not be provisioned with private DN on the H.323 GW.
- When a BCM is configured to route calls to lines (MG9K, Mediatix, or native) using the Private route type on the BCM, the calling number will be delivered as an 'unknown' number. To allow the calling number to be presented to lines when calling from a BCM, a route type other than Private should be used.

H.323 Gateway limitations and restrictions

The following limitations and restrictions apply to the (I)SN08 Base application.

- For the calls terminating on the S1000M1 and S1000, the NET_RINGBACK_ON option must be provisioned in the TABLE LTDATA for all S1000M1 and S1000 trunk CLLIs in order to get the audible ringback tone during the Call Setup (at the time of ALERTing).
- The BCM GW does not support SlowStart signaling on origination.
- The CS 2000 H.323 System currently interoperates with Cisco's H.323 IOS- version 12.2(24) 2600 and 3620 GWs; however, there are a number of restrictions to be addressed in a future load release from Cisco:
 - Cisco calls are terminated by the GW 1 minute after a GWC warm SWACT.
 - Cisco 2600 and 3620 GWs must be configured in a 1:1 static bind NAT configuration
 - For call scenarios where the 2600 or 3620 Cisco GW is to connect to the UAS (in SN06.2) and the UAS/AMS [in (I)SN07], and the Media Portal is present in the call topology due to NAT/FW traversal, the Cisco GW must be configured to transmit/receive immediately from the Cisco configuration level:
`voice rtp send-recvto`
- For Core Cold and Reload restarts and for GWC Cold SWACT, H.323 calls may not get dropped in the H.323 GWs and will be dropped in the Core. The audit system in the CS2K will clear such calls.

- After a warm SWACT on the GWC, any attempted tcp messaging caused by a feature activation or dtmf key press (if it is conveyed by out of bandmsg) will cause a warm swacted call to drop.
- The following are a few features that are not currently supported on the CS2K H.323 IPPBX.
 - Executive Busy Override (EBO)
 - Automatic Call Back (ACB); however, Network Ring Again is supported for calls within the same customer group.
 - Release Link Trunk (RLT)
 - Malicious Call Hold (MCH); however, MCH is supported on the Carrier Based Lines (CICM, MediaTrix, etc).
 - Network ACD
- Codec Provisioning: If an H.323 GW can support both G.711 and G.729, then G.711 should be provisioned as a default codec and G.729 should be provisioned as a preferred codec. No GW should be configured as having only a G.729 codec. Configure BCM3.5 to have no preferred codec and to have G711 as the default codec. For the BCM3.5 Unified Manager, there is a need to set G711 as the default codec for the Nortel IP terminal. Configure BCM 3.6 gateways to have G.711 as default and G.729 preferred.
- M1 Conference Keys only work after the conference party answers the call.
- H.323 GWs do not send any packets till the CONNECT. So we need to change to the loss timer on the Media Gateway 15000 to 0 - see the third bullet of the [Configuration notes on page 91](#).
- There are three different ways to carry DTMF digits:
 - Carry DTMF digits as an inband DTMF tone. But low bit-rate voice codecs such as G.729 cannot be guaranteed to reproduce these tone signals accurately enough for automatic recognition.
 - Use out-of-band DTMF digits in signaling.
 - Use the RTP payload to carry DTMF digits, Telephony Tones, and Telephony Signals as specified in RFC 2833.
- An inband DTMF tone is not sufficient for certain codecs such as G.729. RFC 2833 solves the problem by carrying DTMF digits in the RTP Payload with special encoded RTP packets, but currently,

certain H.323 GWs such as BCM, S1000M/S1000 do not support RFC 2833.

Following is a list of ways to carry DTMF digits between different GWs:

Termination Origination	To H.323 GWs which Support RFC 2833	H.323 GWs which do Not support RFC 2833
From H.323 GWs which Supports RFC 2833	RFC 2833	Out of Band DTMF Signaling
From H.323 GWs which do Not Support RFC 2833	Out of Band DTMF Signaling	Out of Band DTMF Signaling
From the Media Gateway 15000 Supports (PVG RFC 2833)	RFC 2833	<p>DTMF digits pressed on the phone off H.323 GW are delivered to the Media Gateway 15000 in out-of-band dtmf signaling; the Media Gateway 15000 will play out the tone.</p> <p>DTMF digits pressed on the phone off Media Gateway 15000:</p> <ul style="list-style-type: none"> - G.711 Codec <p>H.323 does not request to collect DTMF digits; so, DTMF from the Media Gateway 15000 will be delivered as an in-band tone.</p> <ul style="list-style-type: none"> - G.729 Codec <p>H.323 GWs do request the Media Gateway 15000 to collect DTMF digits; so, the DTMF from the Media Gateway 15000 will be delivered as out-of-band signaling.</p>
Mediatrix Supports (Mediatrix supports RFC 2833)	RFC 2833	<p>DTMF digits pressed on the phone off the H.323 GW are delivered to the Mediatrix GWC in out-of-band dtmf signaling, but the Mediatrix side will NOT play out the tone.</p> <p>H.323 does not request Mediatrix to collect DTMF digits; so, DTMF pressed on Mediatrix will be delivered as an in-band tone.</p>

H.323 Protocol limitations

H.323 protocol does not support providing audible ringback tones to the H.323 subscriber after a call has been answered. Due to this limitation, the H.323 subscriber will hear silence in certain feature interaction scenarios instead of audible ringback.

In these scenarios, the service interaction will function as normal, except for the fact the H.323 subscriber will hear silence as opposed to audible ringback. Since all of these scenarios involve answered calls, the H.323 subscriber will most likely know that they are on hold and waiting for some action to complete.

These scenarios include:

- A line gateway (such as Mediatrix) invokes Call Park on a call that is received from an H.323 subscriber. In this scenario, the H.323 subscriber will hear silence until the call is retrieved.
- A line gateway (such as Mediatrix) is involved in a call with an H.323 subscriber, followed by the line gateway initiating a conference to another party. If the third party is conferenced into the call while still alerting, the H.323 subscriber will not receive audible ringback.

Note: If the third party is connected through a TDM ISUP trunk, then audible ringback will be provided by the terminating office and audible ringback will be heard.)

- A line gateway (such as Mediatrix) performs a call transfer of an answered call from an H.323 subscriber to an alerting party.
- Certain ACD/UCD scenarios cause the call to be queued after answer.

Configuration notes

The following notes apply to the H.323 Gateway configuration:

- Add the NET_RINGBACK_ON in the table ldata to the get the network ringback for the S1000M terminating call.

Examples include:

— ISDN 13 SERV

— SERV Y Y ALWAYS ALWAYS (NET_RINGBACK_ON)
(PRI_IP_PROT H323) \$

— ISDN 14 SERV

— SERV Y Y ALWAYS ALWAYS (NET_RINGBACK_ON)
(PRI_IP_PROT H323) \$

- The Media proxy (RTP Portal) must be associated in CS 2000 Mgmt. Server -> GWC# ->Provisioning -> Media Proxies -> for those GWCs that have at least one GW behind the NAT.
- Most of the H.323 GWs do not send any packets till the CONNECT. So we need to change the loss timer on the Media Gateway 15000 (PVG) to 0.

Changing the loss timer on the Media Gateway 15000 to zero

At the command line

- 1 Telnet to your Nortel Networks Media Gateway 15000, and check the card slot you are using on the Media Gateway 15000.
 - 2 **St prov**
 - 3 **set nsta/13 vgs brag/1 loss 0**
 - 4 **set nsta/13 vgs brag/2 loss 0**
 - 5 **set nsta/13 vgs brag/16 loss 0**
 - 6 **act prov**
 - 7 **confirm prov**
- Make sure that the RFC 2833 is clicked in the CS 2000 Mgmt. Server 'Configure Network' GUI, if the RFC 2833 support is required for the in-band DTMF tones.
 - Codecs are added to the CS 2000 Mgmt. Server in a preferred order to align with the Gateway codec settings.
 - The two configuration rules must be setup for each H.323 GW that is in the Enterprise IP-VPN on the NAT router. The first rule maps the RAS port of the GW (UDP transport) to NATed IP(of the NAT router) + port (X open on the NAT router). The second rule maps the

Call signalling port of the GW (TCP transport) to the NATed IP(of the NAT router) + port (X+1open on the NAT router).

Examples include:

— 10.19.199.195(NAT Router IPAddress):7000(port on the NAT router)<-> 10.88.88.55(H.323 GW IP address):1719(RAS port on the GW)

— 10.19.199.195(NAT Router IPAddress):7001(port on the NAT router)<-> 10.88.88.55(H.323 GW IP address):1720(Call Sig. port on the GW)

- For gateways such as Cisco GWs that do not provide a static RAS port, N:1 addressing is not an option as mapping the port must be done dynamically. This is a NAT 1:1 configuration and is supported by giving port 0 in the CS 2000 Mgmt. Server for the Cisco GW.
- If a H323 gateway in the International market does not support overlap signaling for termination, then the translation in the core should be set to do en-bloc signaling by using the TABLE PXCODE and minmax mm option to control for the en-bloc sending.
- The “INTER DOMAIN” bool is in the TABLE TRKOPTS for the SIP-T Trunks should be set as follows
 - “INTER DOMAIN” bool should be set to Y (that is, inter-domain) for all SIP-T trunks except loop-around trunks.
 - “INTER DOMAIN” bool should be set to N (that is, intra-domain) for SIP-T loop-around trunks.
- Do not enable e.164 registration in the H.323 GW as this kind of registration is not supported by GWC.
- For NATs with per-protocol time-outs, the recommended timer values are
 - For TCP (for Call Signaling), a bind time-out of 35 minutes.
 - For UDP (for RAS), a bind time-out of 3 minutes.

For NATs that have a single global time-out value, a bind time-out value of 35 minutes is recommended.



Configuration Management

Initial Carrier Hosted Services (CHS) configuration is performed by Nortel Networks installation personnel.

Refer to the following procedures reflected in CHS Configuration Management:

- [Enabling Advice of Charge on page 95](#)
- [Enabling VCAC SOC on page 101](#)

Integrated Element Management System

Many fault, configuration, accounting, performance, and security activities in (I)SN08 may now be performed using the Integrated Element Management System (IEMS). For more information, refer to the *Integrated EMS Basics NTP, NN10329-111*.

To launch the CS 2000 GWC Manager or the CS 2000 SAM21 Manager, refer to the following procedures in the *Integrated EMS Basics NTP, NN10329-111*:

- “Launching GWC Manager”
- “Launching SAM21 Manager”

Enabling Advice of Charge

Advice of Charge (AOC) gives the CS2000 Call Server the ability to send network incurred charges to the ISDN subscriber within call control or facility messages.

For Advice of Charge (AOC) datafill considerations, refer to “Enabling Advice of Charge” on page 95

For APDU timing message considerations, refer to “Conditions for APDU timing messages” on page 96

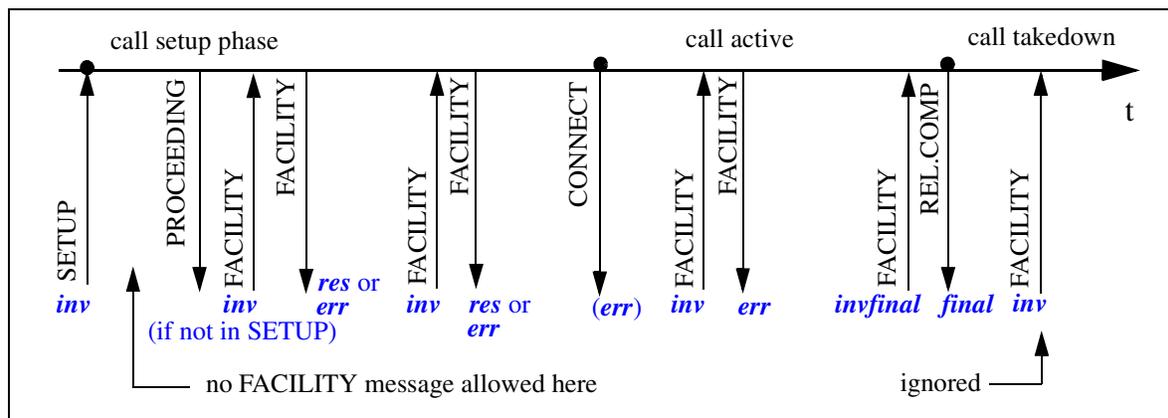
The following figure shows the per-call sequence of AOC requests and responses on a relative time scale, as supported by this activity.

The following AOC APDU types are used.

AOC APDU types

Request	Definition
<code>inv</code>	invoke APDU requesting AOC-D
<code>res</code>	returnResult APDU reporting positive acknowledgement for an AOC-D request
<code>err</code>	returnError APDU reporting negative acknowledgement for an AOC-D request (with error values ‘notAvailable’ or ‘supplementaryServiceInteraction NotAllowed’)
<code>invfinal</code>	invoke APDU requesting AOC-E
<code>final</code>	invoke APDU reporting AOC-E final charge
	Bullets on the time axis delineate call phases. Only messages relevant for AOC request handling are shown.

Timings of AOC requests and responses



Conditions for APDU timing messages

APDU timing messages include the following conditions:

- An **inv** APDU may be sent in either **SETUP** or **FACILITY** message, but not in both.
- An **inv** APDU in a **FACILITY** message may be sent after **PROCEEDING** and before **CONNECT**. Instead of **PROCEEDING** there may be a **SETUP ACK** message.
- An **err** APDU in the **CONNECT** message will only be sent if an **inv** APDU was previously received, and the AOC service is not provisioned in table **TRKOPTS**.
- An **inv** APDU received after **CONNECT** and before **RELEASE** will be replied with an **err** APDU in **FACILITY** (supplementary Service Interaction Not Allowed).
- An **inv** APDU received after **RELEASE COMPLETE** will be discarded by the CS2000 without reply.
- An **invfinal** APDU may be sent in a **FACILITY** message up to the beginning of the call takedown phase.

Please note that H.323 does support a special forward clearing procedure for AOC calls: the originating gateway may send **getFinalCharge.inv** in a **FACILITY** message which triggers a call release initiated by the CS2000.

Application

Use this procedure to provision the Advice of Charge (AOC) option. The AOC option can be provisioned as follows:

- for trunk groups, the AOC option is provisioned through table TRKOPTS
Refer to “Provisioning AOC through table TRKOPTS” on page 98.
- for GWCs, the AOC option is provisioned through table SERVINV
Refer to procedure *Provisioning Advice of Charge, Gateway Controller Configuration Management document, NN10205-511*.
- for the communication server, the AOC option is provisioned through the following Software Optionality Control (SOC) codes:
 - NETK0024 (Network AOC tariff)
 - NSUP0020 (NAOC/PCA Supp Svcs)
 - NSUP0023 (PCA SW Metering Support for Billing)
 - PBXT0011 (ETSI PRI Info)
 - PBXT0018 (QSIG AOC)Refer to “Provisioning AOC through SOC” on page 99.

Restrictions and limitations

The following restrictions and limitations apply to AOC:

- Sending of AOC charge information as currency units is not supported for H.323 trunks.
- AOC calculation based on the charging interval is not supported.
- A delta may exist between the number of charge units saved in the AMA record by the CM (controlled by SOC NSUP0023) and the number of charge units provided by the AOC metering counter in the GWC. This is due to charge interval-based calculations done in the CM.
- The GWC calculation of the AOC does not influence or change AMA records extension. There are no direct interactions between the AMA billing system and the AOC functionality in the GWC.
- AOC on H.323 is only supported for bearer calls. AOC on H.323 for non-bearer calls is not supported. Facility IEs with AOC operations for these calls are transparently passed through the CS 2000.

Action

Use Procedure , “Provisioning AOC through table TRKOPTS,” on page 98 to provision AOC using the TRKOPTS table.

Provisioning AOC through table TRKOPTS

At the MAP terminal

1 Start the table editor, and access table TRKOPTS by typing

```
> TABLE TRKOPTS
```

and pressing the Enter key.

Example response:

```
TABLE: TRKOPTS
```

2 Set the following fields:

- A OCD - to enable or disable AOC-D. If set to Y, facility messages are sent to provide the ISDN subscriber with the charge unit count on a regular basis during a call
- A OCE - to enable or disable AOC-E. If set to Y, the final charge unit count is sent at the end of the call in a standard call control message during the disconnect phase
- D SCNT - to specify the discount class number to which the subscriber belongs
- A OCREL - to enable or disable releasing a call if AOC is not available, that is, if the datafill on both the CS 2000 and GWC is not complete. Emergency calls and Priority calls are not released although this flag is set.

For H.323, you must set AOCREL to N, otherwise a GW misconfiguration may cause calls to be released.

If AOCREL is TRUE, the Q.931 RELEASE COMPLETE message contains no AOC information.

- A OCCHGOV - to enable or disable tariff and discount changeover during time of day changeover. This flag also controls if changes in the tariff tables apply directly to active calls.
- P ROTOCOL - to choose the AOC protocol.

If set to KEYPAD, the AOC information will be sent in the national defined KEYPAD protocol to the user. If set to FUNCTIONAL, the FUNCTIONAL protocol will be used instead.

For H.323, you must set PROTOCOL to FUNCTIONAL.

- U NITS - to choose which units shall be used to send the charging information.

If set to CURRENCY, the charging information will be given in currency units of the specified market.

If set to CHARGING, charging units will be used.

For H.323, you must set UNITS to CHARGING.

- REQUEST - to choose if AOC is only invoked if it is explicitly requested by the user if the SETUP message (REQUEST = Y) or if it is invoked for every call (REQUEST = N).

For H.323, REQUEST must be set to Y.

- 3 Exit the table editor.
- 4 This procedure is complete.

Provisioning AOC through SOC

At the MAP terminal

- 1 Set the right-to-use (RTU) flag for the required SOCs by typing

```
> ASSIGN RTU <keycode> TO <SOC>
```

and pressing the Enter key.

where

keycode

is the keycode Nortel Networks provided you

SOC

is the SOC code (NETK0024, NSUP0020, NSUP0023, PBXT0011, PBXT0018)

- 2 Activate the SOC code by typing
- ```
> ASSIGN STATE ON TO <SOC>
```
- and pressing the Enter key.

*where*

#### **SOC**

is the SOC code (NETK0024, NSUP0020, NSUP0023, PBXT0011, PBXT0018)

- 3 This procedure is complete.



## Enabling VCAC SOC

The following procedures address the Computing Module (CM) datafill changes and treatment on the XA-Core required for the VCAC-SOC option (CS2Q0002).

### ATTENTION

For H.323 gateways using VCAC, datafill is **REQUIRED** in table TMTMAP.

Treatment NBLN **must** be datafilled for the signaling protocol being used on the H.323 trunk, and this treatment must release the call back to the originating node. The treatment **must not** be played locally.

### Datafilling table TMTMAP for NBLN

#### *At the command line*

- 1 Refer to the following example to datafill Q767 signaling for NBLN in Table TMTMAP.

**Note:** Use the 'Normal unspecified' release cause to send the call back to the originator:

#### Example datafill for TABLE: TMTMAP

**Q767 NBLN ALLBC ISUP NOLOCAL NORMUNSP RPRIVNET N**

- 2 This procedure is complete.

### Datafilling the CM for VCAC-SOC and treatment

### ATTENTION

For line gateways using VCAC, datafill is **REQUIRED** in table TMTCNTL.

Treatment NBLN **must** be datafilled and **must** be set to a tone before you enable the VCAC SOC option.

#### *At the command line*

- 1 Datafill the NBLN treatment in table TMTCNTL:OFFTREAT
- 2 Refer the CLLI to a tone, not an announcement.

**Example: NBLN Y S CONGESTION**

- 3 This procedure is complete.

### Enabling the VCAC SOC option on the CM

#### ATTENTION

You **must** datafill line treatment NBLN, and you **must** set treatment NBLN to a tone **before** you enable the VCAC SOC option.

#### *At the command line*

- 1 Type the following to set the Right to Use (RTU) flag to Y and enable the VCAC-SOC option:

**ASSIGN RTU <keycode> TO CS2Q0002**

**Note:** The RTU flag is set to Y.

- 2 Type the following to change the option state from IDLE to ON:

**ASSIGN STATE ON TO CS2Q0002**

- 3 This procedure is complete.

### Disabling the VCAC SOC option on the CM

#### *At the command line*

- 1 Type the following to set the Right to Use (RTU) flag to Y and disable the VCAC-SOC option:

**REMOVE RTU <keycode> FROM CS2Q0002**

- 2 Type the following to change the option state from IDLE to ON:

**ASSIGN STATE IDLE TO CS2Q0002**

- 3 This procedure is complete.

---

## Migrating from Basic VCAC to Network VCAC on the Policy Controller

---

### Purpose of this procedure

In the (I)SN08 release, the Policy Controller supports the Network Resource Reservation Policy using Network Virtual Call Admissions Control (VCAC) as the enforcement mechanism. Network VCAC enhances Basic VCAC and moves call admissions control from the CS 2000 system to the Policy Controller.

Use procedure “Migrating from Basic VCAC to Network VCAC on the Policy Controller” on page 104 to migrate from Basic VCAC to Network VCAC on the Policy Controller.

### Limitations and restrictions

This procedure has the following limitations and restrictions:

- This procedure is only for offices that are already operating with Basic VCAC on their CS 2000 system and are upgrading to Network VCAC.
- This procedure does not apply to offices with new installations that contain (I)SN08 Network VCAC or to offices upgrading to (I)SN08 Basic VCAC.
- During the migration from Basic VCAC to Network VCAC, do not perform any Network zone provisioning until you activate Network VCAC on the Policy Controller.
- Activating Network VCAC is network-wide. You cannot operate both Basic VCAC and Network VCAC on your CS 2000 network.
- There is no provisioning connection between the Policy Controller and the CS 2000 system in (I)SN08. You must provision all network zone topology information first into CS 2000 system and then into the Policy Controller.

### Prerequisites

This procedure has the following prerequisites:

- You must upgrade all Communication Server 2000 (CS 2000) components to the (I)SN08 release before you begin this procedure. The CS 2000 system continues to support Basic VCAC over the

upgrade from the SN07 release to the (I)SN08 release until you activate Network VCAC.

For upgrade procedures on CS 2000 components, refer to NTP *Upgrading a Carrier Voice over IP Network* (NN10440-450).

- You must already be operating Basic VCAC on your CS 2000 network (The Basic VCAC value is set to ON).

## Action

### ATTENTION

All NAT, LBL, and composite NAT-LBL zones must be configured identically and in the same order first on the CS 2000 system and then on the Policy Controller. If you change a network zone attribute on the CS 2000 system, you must immediately change it on the Policy Controller. Otherwise, Network VCAC will not function correctly.

For the CS 2000 system network zone GUI configuration information, refer to NTP *Gateway Controller Configuration Management* (NN10205-511). For the CS 2000, refer to NTP *Policy Controller Configuration Management* (NN10432-511).

## Migrating from Basic VCAC to Network VCAC on the Policy Controller

### At the *SESM/OSSGate interface/Policy Controller*

- 1 After the CS 2000 components are upgraded to the (I)SN08 release, do not make any changes to the network zones (NAT, LBL, and composite NAT-LBL zones) on the CS 2000 system until the switch to Network VCAC on the Policy Controller is complete. This restriction maintains consistency of the topology data on the CS 2000 system and the Policy Controller and ensures Network VCAC will work properly.
- 2 Ensure that you have the network zone details (all NAT, LBL, and composite NAT-LBL zones) available from the CS 2000 system. Get a detailed list of network zones (NAT, LBL, or composite NAT-LBL zones) currently provisioned in the CS 2000 system by querying all network zones names, IDs and network zone parents.

For the GUI procedure, refer to the procedure “View available network devices” from NTP *Gateway Controller Configuration Management* (NN10205-511). For the XML procedure, use the

XML command “query NetworkZone” from NTP *OSSGate User’s Guide* (NN10004-512).

- 3 Install and commission the Policy Controller with the (I)SN08 release.

For Policy Controller installation and commissioning procedures, refer to Installation Method *Policy Controller Installation and Commissioning* (IM 24-0493) and NTP *Policy Controller Configuration Management* (NN10432-511).

- 4 Use the network zone data that you obtained from the CS 2000 system to provision network zones on the Policy Controller. The network zone data that you enter on the Policy Controller must be identical and in the same order as the network zone data currently on CS 2000 system. You must add a network parent zone before its network child zone. To ensure a network zone match between the systems, you must manually verify that the network zone data is identical to both.

You can use either the GUI or XML procedure to add a network zone on the Policy Controller. Refer to the procedure “Add Network Zone” from NTP *Policy Controller Configuration Management* (NN10432-511).

- 5 Add and provision the Policy Controller into the CS 2000 system, which allows the CS 2000 system to establish connection to the Policy Controller. Confirm that the Policy Controller is functioning correctly, that its TCP links to the CS 2000 system are working, and no alarms have been generated.

For the GUI procedure, refer to procedure “Add a Policy Controller” in the latest version of NTP *Gateway Controller Configuration Management* (NN10205-511). For the XML procedure and the commands, refer to NTP *OSSGate User’s Guide* (NN10004-512).

- 6

**ATTENTION**

To minimize disruption to the network, perform the switch to Network VCAC during a period when there are fewer calls.

Using the GUI procedure or the XML command, switch ON Network VCAC. When Network VCAC is activated, the CS 2000 system stops running Basic VCAC, and switches to using the Policy Controller for Network VCAC policy decisions.

For the GUI procedure, refer to the latest version of *NTP Gateway Controller Configuration Management* (NN10205-511). For the XML procedure, refer to *NTP OSSGate User's Guide* (NN10004-512).

When the Network VCAC is activated, all calls trigger bandwidth management through the Policy Controller. There is no current bandwidth status between Basic and Network VCAC so the Policy Controller will have no knowledge of existing calls that were set up under Basic VCAC. This condition can lead to temporary degradation of voice quality on some calls.

**7**

**ATTENTION**

The provisioning restrictions have changed in (I)SN08. In (I)SN08, it is possible to mix agent types (IAD, CICM, H323) behind a common link. Changes to agent types will not survive a rollback, so do not make any changes to the network zone topology until Network VCAC has had sufficient time to soak and be tested.

Verify call processing to confirm Network VCAC on the Policy Controller is functioning properly. Monitor the Policy Controller, Gateway Controller, and Core logs that indicate a problem. Before making any network zone topology changes, allow the system to soak for a period of time so potential errors can appear and be corrected.

- 8** When the system is functioning correctly, you can then make changes to the network zone data in the CS 2000 system and the Policy Controller. Ensure that all network zone changes are entered identically first on the CS 2000 system and then on the Policy Controller to manually keep them in synchronization doing forward. Otherwise, there will be a network zone topology mismatch and calls will fail.

For GUI procedures to add network zones and change network zone attributes for the CS 2000 system and the Policy Controller, refer to the latest version of *NTP Gateway Controller Configuration Management* (NN10205-511). For the XML procedures, refer to *NTP OSSGate User's Guide* (NN10004-512).

- 9** This procedure is complete.

## Network VCAC rollback

### **ATTENTION**

Only perform a rollback from Network VCAC to Basic VCAC during the period when you are preventing changes to the network zone topology in the CS 2000 system (Up to step 8). Otherwise, network zone topology mismatches can occur between the CS 2000 system and the Policy Controller, causing Basic VCAC to work incorrectly.

Use procedure “Rollback Network VCAC to Basic VCAC” on page 107 to abort the switch to Network VCAC and rollback to Basic VCAC.

### **Rollback Network VCAC to Basic VCAC**

#### ***At the SESM/OSSGate interface***

- 1** Deactivate Network VCAC in the CS 2000 system. For the GUI procedure, refer to the procedure “Change the Network VCAC status” in the latest version of the *NTP Gateway Controller Configuration Management* (NN10205-511). For the XML procedure, refer to *NTP OSSGate User’s Guide* (NN10004-512).

After Network VCAC is deactivated, the CS 2000 system will manage bandwidth. The bandwidth status does not transfer from the Policy Controller to the CS 2000, which can lead to temporary degradation of voice quality on calls. As existing calls clear, potential problems are removed.

- 2** This procedure is complete.



## Features and services

This section lists the services that CHS supports.

### CICM services, NA and international

The following table lists the North American and international services that are currently supported by the CICM clients.

**Note:** Not all services are supported by both North American and international markets. Notice the applicable footnotes at the end of this table.

| Option      | Service                                     | IP Phone 2004 | IP Phone 2002 | IP Phone 2033 | m6350 SoftClient |
|-------------|---------------------------------------------|---------------|---------------|---------------|------------------|
| 3WC         | Three Way Calling                           | x             | x             | x             | x                |
| AAB         | Automatic Answer Back                       | x             | x             | x             | x                |
| ACB         | Automatic Call Back                         | x             | x             | x             | x                |
| ACD         | Automatic Call Distribution                 | x             | x             | x             | x                |
| ACD - AAK   | ACD - Answer Agent Key                      | x             | x             | x             | x                |
| ACD - ACDNR | ACD - Automatic Call Distribution Not Ready | x             | x             | x             | x                |
| ACD - ASL   | ACD - Agent Status Lamp                     | x             | x             | x             | x                |
| ACD - CAG   | ACD - Call Agent                            | x             | x             | x             | x                |
| ACD - CIF   | ACD - Controlled Interflow                  | x             | x             | x             | x                |
| ACD - CLSUP | ACD - Call Supervisor                       | x             | x             | x             | x                |
| ACD - DASK  | ACD - Display Agent Status                  | x             | x             | x             | x                |
| ACD - DQS   | ACD - Display Queue Status                  | x             | x             | x             | x                |

| Option          | Service                                           | IP Phone 2004 | IP Phone 2002 | IP Phone 2033 | m6350 SoftClient |
|-----------------|---------------------------------------------------|---------------|---------------|---------------|------------------|
| ACD - DQT       | ACD - Display Queue Threshold                     | x             | x             | x             | x                |
| ACD - ECM / ICM | ACD - Extended Call Management                    | x             | x             | x             | x                |
| ACD - EMK       | ACD - Emergency Key                               | x             | x             | x             | x                |
| ACD - FAA       | ACD - Forced Agent Availability                   | x             | x             | x             | x                |
| ACD - LOB       | ACD - Line of Business                            | x             | x             | x             | x                |
| ACD - NGTSRVCE  | ACD - Night Service                               | x             | x             | x             | x                |
| ACD - OBS       | ACD - Observe Agent                               | x             | x             | x             | x                |
| ACD - SUPR      | ACD - Supervisor                                  | x             | x             | x             | x                |
| ACRJ            | Anonymous Caller Rejection                        | x             | x             | x             | x                |
| AIN             | Advanced Intelligent Network                      | x             | x             | x             | x                |
| AINDN           | AIN Directory Number                              | x             | x             | x             | x                |
| AINMWT          | AIN Message Waiting                               | x             | x             | x             | x                |
| AMATEST         | Automatic Message Accounting Test Call Capability | x             | x             | x             | x                |
| AMSGDENY        | Access to Messaging Deny                          | x             | x             | x             | x                |
| AR              | Automatic Recall                                  | x             | x             | x             | x                |
| ARDDN           | Automatic Recall Dialable DN                      | x             | x             | x             | x                |
| ATC             | Automatic Time and Charges                        | x             | x             | x             | x                |
| AUD             | Automatic Dial                                    | x             | x             | x             | x                |

| Option   | Service                                         | IP Phone 2004 | IP Phone 2002 | IP Phone 2033 | m6350 SoftClient |
|----------|-------------------------------------------------|---------------|---------------|---------------|------------------|
| AUL      | Automatic Line                                  | x             | x             | x             | x                |
| AUTODISP | Automatic Display                               | x             | x             | x             | x                |
| AVT      | AUTOVON Termination                             | x             | x             | x             | x                |
| BLF      | Busy Lamp Field for Meridian Business Sets      | x             | x             | x             | x                |
| BNN      | Bridged Night Number                            | x             | x             | x             | x                |
| CBE      | Call Forwarding Busy Internal Calls Only        | x             | x             | x             | x                |
| CBI      | Call Busy Intragroup (or Channel Bus Interface) | x             | x             | x             | x                |
| CBU      | Call Forwarding Busy Unrestricted               | x             | x             | x             | x                |
| CCW      | Cancel Call Waiting                             | x             | x             | x             | x                |
| CDC      | Customer Data Change                            | x             | x             | x             | x                |
| CDE      | Exclude External Calls from Call Forwarding     | x             | x             | x             | x                |
| CDI      | Exclude Intragroup Calls from Call Forwarding   | x             | x             | x             | x                |
| CDU      | Call Forwarding Do Not Answer Unrestricted      | x             | x             | x             | x                |
| CFB      | Call Forwarding Busy                            | x             | x             | x             | x                |
| CFCW     | Call Forward Call Waiting                       | x             | x             | x             | x                |
| CFD      | Call Forwarding Do Not Answer (Business sets)   | x             | x             | x             | x                |
| CFDVT    | Call Forwarding Do Not Answer Variable Timer    | x             | x             | x             | x                |
| CFF      | Call Forwarding Fixed                           | x             | x             | x             | x                |

| Option        | Service                                      | IP Phone 2004 | IP Phone 2002 | IP Phone 2033 | m6350 SoftClient |
|---------------|----------------------------------------------|---------------|---------------|---------------|------------------|
| CFGD          | Call Forwarding Do Not Answer for Hunt Group | x             | x             | x             | x                |
| CFI           | Call Forwarding Intragroup                   | x             | x             | x             | x                |
| CFK           | Call Forwarding on a per Key Basis           | x             | x             | x             | x                |
| CFMDN         | Call Forwarding MADN Secondary Member        | x             | x             | x             | x                |
| CFRA          | Call Forwarding Remote Access                | x             | x             | x             | x                |
| CFS           | Call Forwarding Simultaneous Screening       | x             | x             | x             | x                |
| CFTB          | Call Forward Timed for CFB                   | x             | x             | x             | x                |
| CFTD          | Call Forward Timed for CFD                   | x             | x             | x             | x                |
| CFU           | Call Forwarding Universal                    | x             | x             | x             | x                |
| CFWVAL        | Call Forwarding Validation                   | x             | x             | x             | x                |
| CID (NTS_CID) | Calling Party Identification                 | x             | x             | x             | x                |
| CIR           | Circular Hunt                                | x             | x             | x             | x                |
| CLI           | Calling Line Identification                  | x             | x             | x             | x                |
| CMCF          | Control Multiple Call Forwarding             | x             | x             | x             | x                |
| CNDBO         | Calling Number Delivery Blocking Override    | x             | x             | x             | x                |
| CNF           | Station Controlled Conference                | x             | x             | x             | x                |

| Option   | Service                              | IP Phone 2004 | IP Phone 2002 | IP Phone 2033 | m6350 SoftClient |
|----------|--------------------------------------|---------------|---------------|---------------|------------------|
| COT      | Customer Originated Trace            | x             | x             | x             | x                |
| COTAMA   | Customer Originated Trace with AMA   | x             | x             | x             | x                |
| CPU      | Call Pickup                          | x             | x             | x             | x                |
| CTD      | Carrier Toll Denied                  | x             | x             | x             | x                |
| CTW      | Call Transfer Warning                | x             | x             | x             | x                |
| CWD      | Dial Call Waiting                    | x             | x             | x             | x                |
| CWI      | Call Waiting Intragroup              | x             | x             | x             | x                |
| CWO      | Call Waiting Originating             | x             | x             | x             | x                |
| CWR      | Call Waiting Ringback                | x             | x             | x             | x                |
| CWT      | Call Waiting                         | x             | x             | x             | x                |
| CWX      | Call Waiting Exempt                  | x             | x             | x             | x                |
| CXR      | Call Transfer                        | x             | x             | x             | x                |
| DCBI     | Directed Call Pickup Barge-In        | x             | x             | x             | x                |
| DCBX     | Directed Call Pickup Barge-In Exempt | x             | x             | x             | x                |
| DCF      | Denied Call Forwarding               | x             | x             | x             | x                |
| DCPK     | Directed Call Park                   | x             | x             | x             | x                |
| DCPU     | Directed Call Pickup                 | x             | x             | x             | x                |
| DCPX     | Directed Call Pickup Exempt          | x             | x             | x             | x                |
| DENYCTFP | Deny Call Transfer Fraud Prevention  | x             | x             | x             | x                |
| DENYISA  | Deny In-Session Activation           | x             | x             | x             | x                |

| Option               | Service                                  | IP Phone 2004 | IP Phone 2002 | IP Phone 2033 | m6350 SoftClient |
|----------------------|------------------------------------------|---------------|---------------|---------------|------------------|
| DID                  | Direct Inward Dialing                    | x             | x             | x             | x                |
| DIN                  | Denied Incoming                          | x             | x             | x             | x                |
| DISA                 | Direct System Inward Access              | x             | x             | x             | x                |
| DISP                 | Display                                  | x             | x             | x             | x                |
| DLH                  | Distributed Line Hunt                    | x             | x             | x             | x                |
| DND                  | Do Not Disturb                           | x             | x             | x             | x                |
| DNH                  | Directory Number Hunt                    | x             | x             | x             | x                |
| DMCT                 | Deny Malicious Call Termination          | x             | x             | x             | x                |
| DNID (NTS_DNID)      | Dialed Number Identification Delivery    | x             | x             | x             | x                |
| DOD                  | Direct Outward Dialing                   | x             | x             | x             | x                |
| DOR                  | Denied Origination                       | x             | x             | x             | x                |
| DRCW                 | Distinctive Ringing/Call Waiting         |               |               | x             |                  |
| DRING                | Distinctive Ringing                      | x             | x             | x             | x                |
| DTM                  | Denied Termination                       | x             | x             | x             | x                |
| E911                 | Emergency Services (interaction support) | x             | x             | x             | x                |
| EBO                  | Executive Busy Override                  | x             | x             | x             | x                |
| EBX                  | Executive Busy Override Exempt           | x             | x             | x             | x                |
| ELN                  | Essential Line                           | x             | x             | x             | x                |
| Int'l Emergency Call | International Emergency Call Routing     | x             | x             | x             | x                |

| Option    | Service                                           | IP Phone 2004 | IP Phone 2002 | IP Phone 2033 | m6350 SoftClient |
|-----------|---------------------------------------------------|---------------|---------------|---------------|------------------|
| EMW       | Executive Message Waiting                         | x             | x             | x             | x                |
| EXT       | Extensipossible Issued-On                         | x             | x             | x             | x                |
| FCTDINT   | Full Carrier Toll Deny for International Carriers | x             | x             | x             | x                |
| FCTDNTER  | InterLATA Full Carrier Toll Denied                | x             | x             | x             | x                |
| FCTDNTRA  | IntraLATA Full Carrier Toll Denied                | x             | x             | x             | x                |
| FGA       | Feature Group A                                   | x             | x             | x             | x                |
| FNT       | Free Number Terminating                           | x             | x             | x             | x                |
| FTRGRP    | Feature Group                                     | x             | x             | x             | x                |
| FTRKEYS   | Feature Keys                                      | x             | x             | x             | x                |
| FXR       | Fast Transfer                                     | x             | x             | x             | x                |
| ICSDEACT  | In Call Service Deactivation                      | x             | x             | x             | x                |
| IECFB     | Internal/External Call Forwarding Busy            | x             | x             | x             | x                |
| IECFD     | Internal/External Call Forwarding Do Not Answer   | x             | x             | x             | x                |
| ILB       | Inhibit Line Busy                                 | x             | x             | x             | x                |
| IN (CS-X) | Intelligent Networks (CS-X)                       | x             | x             | x             | x                |
| INSPECT   | Inspect Key                                       | x             | x             | x             | x                |
| INTPIC    | International Primary Carrier                     | x             | x             | x             | x                |
| IRR       | Inhibit Ring Reminder                             | x             | x             | x             | x                |

| Option  | Service                                                               | IP Phone 2004 | IP Phone 2002 | IP Phone 2033 | m6350 SoftClient |
|---------|-----------------------------------------------------------------------|---------------|---------------|---------------|------------------|
| JOIN    | Conference Join                                                       | x             | x             | x             | x                |
| KSH     | Key Short Hunt                                                        | x             | x             | x             | x                |
| KSMOH   | Key Set Music on Hold                                                 | x             | x             | x             | x                |
| LCDR    | Local Call Detail Recording                                           | x             | x             | x             | x                |
| LI      | Lawful Intercept                                                      | x             | x             | x             | x                |
| LMOH    | Line Music on Hold                                                    | x             | x             | x             | x                |
| LNP     | Local Number Portability (LRN based)                                  | x             | x             | x             | x                |
| LNR     | Last Number Redial                                                    | x             | x             | x             | x                |
| LNRA    | Last Number Redial Associated with Set                                | x             | x             | x             | x                |
| LOD     | Line Overflow to DN                                                   | x             | x             | x             | x                |
| LOR     | Line Overflow to Route                                                | x             | x             | x             | x                |
| LPIC    | IntraLATA PIC                                                         | x             | x             | x             | x                |
| LVM     | Leave Message                                                         | x             | x             | x             | x                |
| MBK     | Make Busy Key                                                         | x             | x             | x             | x                |
| MBSCAMP | Meridian Business Set Station Camp-On                                 | x             | x             | x             | x                |
| MCH     | Malicious Call Hold                                                   | x             | x             | x             | x                |
| MDN MCA | Multiple Appearance Directory Number (MADN) Multiple Call Arrangement | x             | x             | x             | x                |
| MDN SCA | MADN Single Call Arrangement                                          | x             | x             | x             | x                |
| MDNNAME | MADN Member Name                                                      | x             | x             | x             | x                |

| Option  | Service                             | IP Phone 2004 | IP Phone 2002 | IP Phone 2033 | m6350 SoftClient |
|---------|-------------------------------------|---------------|---------------|---------------|------------------|
| MEETME  | Meet Me Conference                  | x             | x             | x             | x                |
| MEMDISP | MADN Member Display                 | x             | x             | x             | x                |
| MLAMP   | MADN Lamp                           | x             | x             | x             | x                |
| MLH     | Multi-line Hunt                     | x             | x             | x             | x                |
| MREL    | MADN Release                        | x             | x             | x             | x                |
| MRF     | MADN Ring Forwarding                | x             | x             | x             | x                |
| MRFM    | MADN Ring Forwarding Manual         | x             | x             | x             | x                |
| MSB     | Make Set Busy                       | x             | x             | x             | x                |
| MSBI    | Make Set Busy Intragroup            | x             | x             | x             | x                |
| MWIDC   | Message Waiting Indication          | x             | x             | x             | x                |
| MWINK   | MADN Message Waiting Indicator      | x             | x             | x             | x                |
| MWQRY   | Message Waiting Query               | x             | x             | x             | x                |
| MWT     | Message Waiting                     | x             | x             | x             | x                |
| NAME    | Name Display                        | x             | x             | x             | x                |
| NOH     | No Receiver Off-Hook Tone           | x             | x             | x             | x                |
| OLS     | Originating Line Select             | x             | x             | x             | x                |
| ONI     | Operator Number Identification      | x             | x             | x             | x                |
| OP      | Operator Services Access            | x             | x             | x             | x                |
| PBL     | Private Business Line               | x             | x             | x             | x                |
| PCWT    | Precedence Call Waiting Termination | x             | x             | x             | x                |

| Option      | Service                            | IP Phone 2004 | IP Phone 2002 | IP Phone 2033 | m6350 SoftClient |
|-------------|------------------------------------|---------------|---------------|---------------|------------------|
| PDO         | Prevent Delete Option              | x             | x             | x             | x                |
| PF          | Power Features                     | x             | x             | x             | x                |
| PIC         | Primary InterLATA Carrier          | x             | x             | x             | x                |
| PILOT       | Pilot DN Billing                   | x             | x             | x             | x                |
| PLP         | Plug-up (Trouble Intercept)        | x             | x             | x             | x                |
| PORT        | 10-digit unconditional LNP trigger | x             | x             | x             | x                |
| PPL         | PVN Priority Line                  | x             | x             | x             | x                |
| PREMTBL     | Call Pre-emption                   | x             | x             | x             | x                |
| PRESET CONF | Preset Conference                  | x             | x             | x             | x                |
| PRH         | Preferential Hunting               | x             | x             | x             | x                |
| PPK         | Call Park                          | x             | x             | x             | x                |
| PRL         | Privacy Release                    | x             | x             | x             | x                |
| PRV         | Privacy for MADN                   | x             | x             | x             | x                |
| QBS         | Query Busy Station                 | x             | x             | x             | x                |
| QCK         | Quick Conference Key               | x             | x             | x             | x                |
| QTD         | Query Time and Date                | x             | x             | x             | x                |
| RAG         | Ring Again                         | x             | x             | x             | x                |
| RCF/RCFEA   | Remote Call Forwarding (Access to) | x             | x             | x             | x                |
| RCVD        | Received Digits Billing            | x             | x             | x             | x                |
| REASDSP     | Reason Display                     | x             | x             | x             | x                |
| RPA         | Repeated Alert                     | x             | x             | x             | x                |

| Option   | Service                            | IP Phone 2004 | IP Phone 2002 | IP Phone 2033 | m6350 SoftClient |
|----------|------------------------------------|---------------|---------------|---------------|------------------|
| RSP      | Restricted Sent Paid               | x             | x             | x             | x                |
| RSUS     | Requested Suspension               | x             | x             | x             | x                |
| SACB     | Subscriber Activated Call Blocking | x             | x             | x             | x                |
| SBLF     | Set Based Lamp Field               | x             | x             | x             | x                |
| SCA      | Selective Call Acceptance          | x             | x             | x             | x                |
| SCF      | Selective Call Forwarding          | x             | x             | x             | x                |
| SCL      | Speed Calling Long                 | x             | x             | x             | x                |
| SCMP     | Series Completion                  | x             | x             | x             | x                |
| SCRJ     | Selective Call Rejection           | x             | x             | x             | x                |
| SCS      | Speed Calling Short                | x             | x             | x             | x                |
| SCU      | Speed Calling User                 | x             | x             | x             | x                |
| SDSDENY  | Special Delivery Service Deny      | x             | x             | x             | x                |
| SDY      | Line Study                         | x             | x             | x             | x                |
| SEC      | Security                           | x             | x             | x             | x                |
| SETMODEL | Set Model                          | x             | x             | x             | x                |
| SIMRING  | Simultaneous Ringing               | x             | x             | x             | x                |
| SL       | Secondary Language                 | x             | x             | x             | x                |
| SLQ      | Single Line Queuing                | x             | x             | x             | x                |
| SLU      | Subscriber Line Usage              | x             | x             | x             | x                |
| SMDI     | Simplified Message Desk Interface  | x             | x             | x             | x                |
| SMDR     | Station Message Detail Recording   | x             | x             | x             | x                |

| Option   | Service                                     | IP Phone 2004 | IP Phone 2002 | IP Phone 2033 | m6350 SoftClient |
|----------|---------------------------------------------|---------------|---------------|---------------|------------------|
| SOR      | Station Origination Restriction             | x             | x             | x             | x                |
| SORC     | Station Origination Restrictions Controller | x             | x             | x             | x                |
| SPB      | Special Billing                             | x             | x             | x             | x                |
| SPR      | Selective Suppression of MDCR/SMDR          | x             | x             | x             | x                |
| SSAC     | Station Specific Authorization Codes        | x             | x             | x             | x                |
| SUPPRESS | Suppress Line Identification Information    | x             | x             | x             | x                |
| SUS      | Suspended Service                           | x             | x             | x             | x                |
| SVCGRP   | Service Group                               | x             | x             | x             | x                |
| TBO      | Terminating Billing Option                  | x             | x             | x             | x                |
| TERM     | Terminating DN Billing                      | x             | x             | x             | x                |
| TES      | Toll Essential                              | x             | x             | x             | x                |
| TFO      | Terminating Fault Option                    | x             | x             | x             | x                |
| TLS      | Terminating Line Select                     | x             | x             | x             | x                |
| TollFree | Toll Free Services                          | x             | x             | x             | x                |
| UCD      | Uniform Call Distribution                   | x             | x             | x             | x                |
| UCDLG    | Uniform Call Distribution Login             | x             | x             | x             | x                |
| WML      | Warm Line                                   | x             | x             | x             | x                |
| WUCR     | Wake Up Call Ring Timeout                   | x             | x             | x             | x                |

**Tandem for VoIP VPN, NA services**

The following table lists the North American services that are currently supported by H.323 Tandem for VoIP VPN.

| <b>Service</b>                | <b>H.323 Access</b> | <b>Media Gateway 15000 PRI Access</b> | <b>Media Gateway 1500 ISUP Access</b> | <b>DPT Access</b> |
|-------------------------------|---------------------|---------------------------------------|---------------------------------------|-------------------|
| Access Options                | x                   | x                                     | x                                     | x                 |
| AIN Services                  | x                   | x                                     | x                                     | x                 |
| AIN 15d support of IDDD       | x                   | x                                     | x                                     | x                 |
| AIN 0, 1 /NFA I/W             | x                   | x                                     | x                                     | x                 |
| AIN ATC Trunk Support         | x                   | x                                     | x                                     | x                 |
| AIN Feature Code Trigger      | x                   | x                                     | x                                     | x                 |
| AIN DCR Interworking          | x                   | x                                     | x                                     | x                 |
| AIN Default Routing           | x                   | x                                     | x                                     | x                 |
| AIN SE R7 OCM METT            | x                   | x                                     | x                                     | x                 |
| AIN SE R8 Carrier Usage       | x                   | x                                     | x                                     | x                 |
| AIN Display Services          | x                   | x                                     | x                                     | x                 |
| AIN SSP Services Enhancements | x                   | x                                     | x                                     | x                 |
| AIN Office Trigger Flex       | x                   | x                                     | x                                     | x                 |
| AIN SE R4 - Collect Info      | x                   | x                                     | x                                     | x                 |
| AIN SE R4 - OHD for PX Trun   | x                   | x                                     | x                                     | x                 |
| AIN SE R4 - OTS               | x                   | x                                     | x                                     | x                 |
| AIN SE R4 - Collect Info      | x                   | x                                     | x                                     | x                 |
| AIN SE R4 - OHD Esc ICM       | x                   | x                                     | x                                     | x                 |
| AIN SE R5 - OnePlus PFX       | x                   | x                                     | x                                     | x                 |

| <b>Service</b>                         | <b>H.323 Access</b> | <b>Media Gateway 15000 PRI Access</b> | <b>Media Gateway 1500 ISUP Access</b> | <b>DPT Access</b> |
|----------------------------------------|---------------------|---------------------------------------|---------------------------------------|-------------------|
| AIN SE R5 - Spfd Cxr PFS               | x                   | x                                     | x                                     | x                 |
| AIN SE R5 - International PFX          | x                   | x                                     | x                                     | x                 |
| AIN SE R5 - OperSvcs PFX               | x                   | x                                     | x                                     | x                 |
| Alternate Routing                      | x                   | x                                     | x                                     | x                 |
| Automatic Route Selection (ARS)        | x                   | x                                     | x                                     | x                 |
| AMA Base                               | x                   | x                                     | x                                     | x                 |
| AMA Mod (CAMA modules)                 | x                   | x                                     | x                                     | x                 |
| BAS ANI                                | x                   | x                                     | x                                     | x                 |
| BAS Two-Digit ANI-CAMA                 | x                   | x                                     | x                                     | x                 |
| BAS Generic - OAM                      | x                   | x                                     | x                                     | x                 |
| BAS Offnet Access Services             | x                   | x                                     | x                                     | x                 |
| BAS Flex Bellcore AMA                  | x                   | x                                     | x                                     | x                 |
| BAS SDM Table Access                   | x                   | x                                     | x                                     | x                 |
| Call Back Queuing                      | x                   | x                                     | x                                     |                   |
| Call Center Services (CPE-based)       | x                   | x                                     | x                                     | x                 |
| Calling Card Services                  | x                   | x                                     | x                                     | x                 |
| Centralized Attendant Service          | x                   | x                                     | x                                     | x                 |
| Centralized Audioconferencing Services | x                   | x                                     | x                                     | x                 |
| Centralized Custom Announcements       | x                   | x                                     | x                                     | x                 |
| Centralized IVR                        | x                   | x                                     | x                                     | x                 |
| Centralized Voice Mail                 | x                   | x                                     | x                                     | x                 |

| <b>Service</b>                               | <b>H.323 Access</b> | <b>Media Gateway 15000 PRI Access</b> | <b>Media Gateway 1500 ISUP Access</b> | <b>DPT Access</b> |
|----------------------------------------------|---------------------|---------------------------------------|---------------------------------------|-------------------|
| DCR Dynamic Call Routing                     | x                   | x                                     | x                                     | x                 |
| DCR Base Class 5 Office                      | x                   | x                                     | x                                     | x                 |
| DCR Base Toll Office                         | x                   | x                                     | x                                     | x                 |
| DCR Base                                     | x                   | x                                     | x                                     | x                 |
| DCR DNM Mess Robust                          | x                   | x                                     | x                                     | x                 |
| DCR Dual X25 Link                            | x                   | x                                     | x                                     | x                 |
| DCR Hand Rem Dual Home                       | x                   | x                                     | x                                     | x                 |
| DCR Mult. Net Access                         | x                   | x                                     | x                                     | x                 |
| DCR Non-DCR Calls                            | x                   | x                                     | x                                     | x                 |
| DCR Universal Translation                    | x                   | x                                     | x                                     | x                 |
| Second Leg O/F Routing                       | x                   | x                                     | x                                     | x                 |
| DISA                                         | x                   | x                                     | x                                     | x                 |
| Direct Termination Overflow                  | x                   | x                                     | x                                     | x                 |
| EQA Toll                                     | x                   | x                                     | x                                     | x                 |
| EQA C7ISUPlerLta Conn AT                     | x                   | x                                     | x                                     | x                 |
| EQA ISUP Intermed. Tandem                    | x                   | x                                     | x                                     | x                 |
| EQA Intermediate Tandem                      | x                   | x                                     | x                                     | x                 |
| EQA Tandem AMA Control                       | x                   | x                                     | x                                     | x                 |
| Expensive Route Warning                      | x                   | x                                     | x                                     | x                 |
| Forced On-net                                | x                   | x                                     | x                                     | x                 |
| Government Emergency Telephony System (GETS) | x                   | x                                     | x                                     | x                 |
| Head-end Break-in                            | x                   | x                                     | x                                     | x                 |

| <b>Service</b>                         | <b>H.323 Access</b> | <b>Media Gateway 15000 PRI Access</b> | <b>Media Gateway 1500 ISUP Access</b> | <b>DPT Access</b> |
|----------------------------------------|---------------------|---------------------------------------|---------------------------------------|-------------------|
| IDDD via ARS                           | x                   | x                                     | x                                     | x                 |
| ISP7 Base ISUP                         | x                   | x                                     | x                                     | x                 |
| ISP7 Aut Cngst Controls                | x                   | x                                     | x                                     | x                 |
| ISP7 Flexible CAUSEMAP                 | x                   | x                                     | x                                     | x                 |
| ISP7 Hop Counter                       | x                   | x                                     | x                                     | x                 |
| ISP7 ISUP ChgNumb/OLIP                 | x                   | x                                     | x                                     | x                 |
| ISP7 TFP/TFC Rtnng Options             | x                   | x                                     | x                                     | x                 |
| ISUP Cellular                          | x                   | x                                     | x                                     | x                 |
| LEA LEAS Toll                          | x                   | x                                     | x                                     | x                 |
| LEA SS7 I/W with LEAS                  | x                   | x                                     | x                                     | x                 |
| LNR LNP                                | x                   | x                                     | x                                     | x                 |
| LNP to Treatment on FOD                | x                   | x                                     | x                                     | x                 |
| LNP 800+ interworking                  | x                   | x                                     | x                                     | x                 |
| Network Dial Plan Display              | x                   | x                                     | x                                     | x                 |
| Network Information Signals            | x                   | x                                     | x                                     | x                 |
| Network Overflow                       | x                   | x                                     | x                                     | x                 |
| Network-Wide Automatic Route Selection | x                   | x                                     | x                                     | x                 |
| NI0 Circular Hunt - NA                 | x                   | x                                     |                                       |                   |
| NI0 Circular Hunt - NI                 | x                   | x                                     |                                       |                   |
| NI0 ISDN Base                          | x                   | x                                     |                                       |                   |
| NI0 ISDN PRI Base                      | x                   | x                                     |                                       |                   |
| NI0 ISDN PRI CNAM                      | x                   | x                                     |                                       |                   |

| <b>Service</b>                             | <b>H.323 Access</b> | <b>Media Gateway 15000 PRI Access</b> | <b>Media Gateway 1500 ISUP Access</b> | <b>DPT Access</b> |
|--------------------------------------------|---------------------|---------------------------------------|---------------------------------------|-------------------|
| NI0 PRI Hotel/Motel                        | x                   | x                                     |                                       |                   |
| NI0 PRI NI-1 Base                          | x                   | x                                     |                                       |                   |
| NI0 PRI NI-2 Base                          | x                   | x                                     |                                       |                   |
| NI0 E911 Scrn NI-2                         | x                   | x                                     |                                       |                   |
| NI0 PRI Message Services                   | x                   | x                                     |                                       |                   |
| NI0 Message Services SMDI Replacement      | x                   | x                                     |                                       |                   |
| NI0 CFW I/F Busy                           | x                   | x                                     |                                       |                   |
| NI0 CFW I/F Busy NI-2                      | x                   | x                                     |                                       |                   |
| OAM EADAS DC and HW Inv.                   | x                   | x                                     | x                                     | x                 |
| OAM Enhanced E/DC Buffer                   | x                   | x                                     | x                                     | x                 |
| OAM EADAS MTC Busy Usage                   | x                   | x                                     | x                                     | x                 |
| OAM EADAS NM I/f                           | x                   | x                                     | x                                     | x                 |
| OAM NetMinder I/F                          | x                   | x                                     | x                                     | x                 |
| Off-Hook Queuing (OHQ)                     | x                   | x                                     | x                                     |                   |
| OHQ Enhanced                               | x                   | x                                     | x                                     |                   |
| Off-net-to-On-net Routing                  | x                   | x                                     | x                                     | x                 |
| On-net-to-Off-net Routing                  | x                   | x                                     | x                                     | x                 |
| PBX-PBX Feature Transparency (MCDN)        | x                   |                                       |                                       | x                 |
| PBX-PBX Feature Transparency (DPNSS)       | x                   | x                                     | x                                     | x                 |
| Private Network Calling (On-net-to-On-net) | x                   | x                                     | x                                     | x                 |

| <b>Service</b>                             | <b>H.323 Access</b> | <b>Media Gateway 15000 PRI Access</b> | <b>Media Gateway 1500 ISUP Access</b> | <b>DPT Access</b> |
|--------------------------------------------|---------------------|---------------------------------------|---------------------------------------|-------------------|
| Private Numbering Plan                     | x                   | x                                     | x                                     | x                 |
| Private Virtual Networking (ESN, PVT, MBG) | x                   | x                                     | x                                     | x                 |
| Tail-end Hop-off                           | x                   | x                                     | x                                     | x                 |
| Time-of-Day Routing                        | x                   | x                                     | x                                     | x                 |
| Time-of-Day NCOS                           | x                   | x                                     | x                                     | x                 |
| Toll-Free Services                         | x                   | x                                     | x                                     | x                 |
| NTS ANI II 25 Screening                    | x                   | x                                     | x                                     | x                 |
| NTS Extended Capability                    | x                   | x                                     | x                                     | x                 |
| NTS PRI I/W to 800                         | x                   | x                                     | x                                     | x                 |
| NTS 800+CID DID Display/ CMS               | x                   | x                                     | x                                     | x                 |
| NTS 800+CID DNID Display/ MDC              | x                   | x                                     | x                                     | x                 |
| NTS Dial Nu Display/BCLID                  | x                   | x                                     | x                                     | x                 |
| NTS Per DN Subscription Controls           | x                   | x                                     | x                                     | x                 |
| NTS 800 Expansion - 888 Cod                | x                   | x                                     | x                                     | x                 |
| NTS 888 Expansion for EO                   | x                   | x                                     | x                                     | x                 |
| NTS 800 Billing Enhancement                | x                   | x                                     | x                                     | x                 |
| NTS 800 CID Number Delivery                | x                   | x                                     | x                                     | x                 |
| NTS RLT w/No Third-Party Itctn             | x                   | x                                     | x                                     | x                 |
| NTS SSP-800 CarID in AMA                   | x                   | x                                     | x                                     | x                 |
| NTS FANI for Toll Free                     | x                   | x                                     | x                                     | x                 |
| Trunk Queuing                              | x                   | x                                     | x                                     |                   |

| Service                                      | H.323 Access | Media Gateway 15000 PRI Access | Media Gateway 1500 ISUP Access | DPT Access |
|----------------------------------------------|--------------|--------------------------------|--------------------------------|------------|
| UDD Services                                 | x            | x                              | x                              | x          |
| UDD FANI Tandem Screen                       | x            | x                              | x                              | x          |
| Uniform Numbering Plan Capability            | x            | x                              | x                              | x          |
| Virtual On-Net                               | x            | x                              | x                              | x          |
| VPN Tariffs                                  | x            | x                              | x                              | x          |
| a. Does not apply to North American markets. |              |                                |                                |            |

### BCM interworking to CICM, NA services

The following table lists the north american (NA) services that are currently supported by H.323 for BCM interworking to CICM and IAD gateway for nodal calls and calls through SIP-T.

| Service                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | BCM interworking to |              |                     |                     |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|--------------|---------------------|---------------------|
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | CICM (nodal)        | CICM (SIP-T) | IAD gateway (nodal) | IAD gateway (SIP-T) |
| Basic Call                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | x                   | x            | x                   | x                   |
| Calling Line Identification (CLID)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                     |              |                     |                     |
| Calling Number Delivery                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | x                   | x            | x                   | x                   |
| <p><b>Note 1:</b> Priority 1 service, not supported.</p> <p><b>Note 2:</b> Priority 1 service, not supported by this activity; although, this service is supported as an MCDN service interworking between two H.323 gateways.</p> <p><b>Note 3:</b> For this activity's CS 2000 to S1000M direction, only private calls contain the MCDN private data (for displaying Calling Name). For CS 2000 to S1000M direction, public calls do NOT contain private MCDN data. Therefore, the public CS 2000 to S1000M direction calls, Calling Display is not applicable/displayed.</p> <p><b>Note 4:</b> Calling Name Delivery within the Core remains unchanged by this activity to either line agents or trunk agents; therefore, existing functionalities, restrictions, or limitations of Calling Name Delivery remain applicable.</p> |                     |              |                     |                     |

| Service                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | BCM interworking to |              |                     |                     |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|--------------|---------------------|---------------------|
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | CICM (nodal)        | CICM (SIP-T) | IAD gateway (nodal) | IAD gateway (SIP-T) |
| Connected Number Delivery                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Note 2              | Note 2       | Note 2              | Note 2              |
| Called Number Delivery                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | x                   | x            | x                   | x                   |
| Network Call Party Name Display                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                     |              |                     |                     |
| Calling Party Name Delivery                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | x                   | x            | x<br>Note 3         | x<br>Note 4         |
| Connected Party Name Delivery                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | -                   | -            | -                   | -                   |
| Original Called Party Name Delivery                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | -                   | -            | -                   | -                   |
| Called Party Name Delivery                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | -                   | -            | -                   | -                   |
| Redirecting Party Name Delivery                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | -                   | -            | -                   | -                   |
| Redirection Party Name Delivery                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | -                   | -            | -                   | -                   |
| Network Call Redirection                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                     |              |                     |                     |
| Network Call Forward All Calls                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | x                   | x            | x                   | x                   |
| Network Call Forward No Answer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | x                   | x            | x                   | x                   |
| Network Call Forward Busy                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | x                   | x            | x                   | x                   |
| Network Hunting                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | -                   | -            | -                   | -                   |
| Call Transfer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | x                   | x            | x                   | x                   |
| <p><b>Note 1:</b> Priority 1 service, not supported.</p> <p><b>Note 2:</b> Priority 1 service, not supported by this activity; although, this service is supported as an MCDN service interworking between two H.323 gateways.</p> <p><b>Note 3:</b> For this activity's CS 2000 to S1000M direction, only private calls contain the MCDN private data (for displaying Calling Name). For CS 2000 to S1000M direction, public calls do NOT contain private MCDN data. Therefore, the public CS 2000 to S1000M direction calls, Calling Display is not applicable/displayed.</p> <p><b>Note 4:</b> Calling Name Delivery within the Core remains unchanged by this activity to either line agents or trunk agents; therefore, existing functionalities, restrictions, or limitations of Calling Name Delivery remain applicable.</p> |                     |              |                     |                     |

| Service                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | BCM interworking to |              |                     |                     |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|--------------|---------------------|---------------------|
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | CICM (nodal)        | CICM (SIP-T) | IAD gateway (nodal) | IAD gateway (SIP-T) |
| Call Pickup                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | -                   | -            | -                   | -                   |
| Network message services                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                     |              |                     |                     |
| Message Waiting Indication                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Note 1              | Note 1       | Note 1              | Note 1              |
| Network Camp-on                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | -                   | -            | -                   | -                   |
| Network Break-In                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | -                   | -            | -                   | -                   |
| Trunk Anti-Tromboning (TAT)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | -                   | -            | -                   | -                   |
| Multi-location business group (MBG)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Note 1              |              |                     |                     |
| Virtual Access to Private Networks (VAPN)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | -                   | -            | -                   | -                   |
| Direct Inward System Access (DISA)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | -                   | -            | -                   | -                   |
| yes: supported MCDN service                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                     |              |                     |                     |
| <p><b>Note 1:</b> Priority 1 service, not supported.</p> <p><b>Note 2:</b> Priority 1 service, not supported by this activity; although, this service is supported as an MCDN service interworking between two H.323 gateways.</p> <p><b>Note 3:</b> For this activity's CS 2000 to S1000M direction, only private calls contain the MCDN private data (for displaying Calling Name). For CS 2000 to S1000M direction, public calls do NOT contain private MCDN data. Therefore, the public CS 2000 to S1000M direction calls, Calling Display is not applicable/displayed.</p> <p><b>Note 4:</b> Calling Name Delivery within the Core remains unchanged by this activity to either line agents or trunk agents; therefore, existing functionalities, restrictions, or limitations of Calling Name Delivery remain applicable.</p> |                     |              |                     |                     |

**BCM interworking to CICM, international services**

The following table lists the International services that are currently supported by H.323 for BCM interworking to CICM for IAD gateway nodal calls and calls through SIP-T.

| Service                            | BCM interworking to |              |                     |                     |
|------------------------------------|---------------------|--------------|---------------------|---------------------|
|                                    | CICM (nodal)        | CICM (SIP-T) | IAD gateway (nodal) | IAD gateway (SIP-T) |
| Basic Call                         | x                   | x            | x                   | x                   |
| Calling Line Identification (CLID) |                     |              |                     |                     |
| Calling Number Delivery            | x                   | x            | x                   | x                   |
| Connected Number Delivery          | x                   | x            |                     |                     |
| Called Number Delivery             | x                   | x            |                     |                     |
| Network Call Party Name Display    |                     |              |                     |                     |
| Calling Party Name Delivery        | x                   | x            | x                   | x                   |
| Network Call Redirection           |                     |              |                     |                     |
| Network Call Forward All Calls     | x                   | x            | x                   | x                   |
| Network Call Forward No Answer     | x                   | x            | x                   | x                   |
| Network Call Forward Busy          | x                   | x            | x                   | x                   |
| Call Transfer                      | x                   | x            | x                   | x                   |
| Call Pickup                        | x                   | x            | x                   | x                   |

### S1000M interworking to CICM, NA services

The following table lists the north american (NA) services that are currently supported by H.323 for S1000M interworking to CICM and IAD gateway for nodal calls, and calls through SIP-T.

| Service                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | S1000M interworking to |              |                     |                     |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|--------------|---------------------|---------------------|
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | CICM (nodal)           | CICM (SIP-T) | IAD gateway (nodal) | IAD gateway (SIP-T) |
| Basic Call                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | x                      | x            | x                   | x                   |
| Calling Line Identification (CLID)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                        |              |                     |                     |
| Calling Number Delivery                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | x                      | x            | x                   | x                   |
| Connected Number Delivery                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Note 2                 | Note 2       | Note 2              | Note 2              |
| Called Number Delivery                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | x                      | x            |                     |                     |
| Network Call Party Name Display                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                        |              |                     |                     |
| Calling Party Name Delivery                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | x                      | x            | x<br>Note 3         | x<br>Note 4         |
| Connected Party Name Delivery                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | -                      | -            | -                   | -                   |
| Original Called Party Name Delivery                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | -                      | -            | -                   | -                   |
| Called Party Name Delivery                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | -                      | -            | -                   | -                   |
| Redirecting Party Name Delivery                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | -                      | -            | -                   | -                   |
| Redirection Party Name Delivery                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | -                      | -            | -                   | -                   |
| <p><b>Note 1:</b> Priority 1 service, not supported</p> <p><b>Note 2:</b> Priority 1 service, not supported except as an MCDN service interworking between two H.323 gateways if tunneled through a CS 2000.</p> <p><b>Note 3:</b> Communication Server 1000M requires Calling Name to be tunneled within an H.323 Setup message. In addition, for the CS 2000 to CS1000M direction, only private calls contain the MCDN private data for displaying Calling Name; public calls do NOT contain private MCDN data. Therefore, for public CS 2000 to CS1000M direction, Calling Display is not displayed.</p> <p><b>Note 4:</b> Calling Name Delivery within the Core remains unchanged to either line agents or trunk agents; therefor, existing functionalities, restrictions, or limitations of Calling Name Delivery remain applicable.</p> |                        |              |                     |                     |

| Service                                                                                                                                                                                                                                                                                                                                                                             | S1000M interworking to |              |                     |                     |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|--------------|---------------------|---------------------|
|                                                                                                                                                                                                                                                                                                                                                                                     | CICM (nodal)           | CICM (SIP-T) | IAD gateway (nodal) | IAD gateway (SIP-T) |
| CLID in Call Detail Record (CDR)                                                                                                                                                                                                                                                                                                                                                    | Note 1                 |              |                     |                     |
| ISDN Signaling Link (ISL)                                                                                                                                                                                                                                                                                                                                                           | -                      | -            | -                   | -                   |
| Network Ring Again                                                                                                                                                                                                                                                                                                                                                                  | Note 1                 |              |                     |                     |
| Network Call Redirection                                                                                                                                                                                                                                                                                                                                                            |                        |              |                     |                     |
| Network Call Forward All Calls                                                                                                                                                                                                                                                                                                                                                      | x                      | x            | x                   | x                   |
| Network Call Forward No Answer                                                                                                                                                                                                                                                                                                                                                      | x                      | x            | x                   | x                   |
| Network Call Forward Busy                                                                                                                                                                                                                                                                                                                                                           | x                      | x            | x                   | x                   |
| Network Hunting                                                                                                                                                                                                                                                                                                                                                                     | -                      | -            | -                   | -                   |
| Call Transfer                                                                                                                                                                                                                                                                                                                                                                       | x                      | x            | x                   | x                   |
| Call Pickup                                                                                                                                                                                                                                                                                                                                                                         | x                      | x            | x                   | x                   |
| Network Automatic Call Distribution (NACD)                                                                                                                                                                                                                                                                                                                                          |                        |              |                     |                     |
| Make Set Busy Key                                                                                                                                                                                                                                                                                                                                                                   | -                      | -            | -                   | -                   |
| Not Ready Key                                                                                                                                                                                                                                                                                                                                                                       | -                      | -            | -                   | -                   |
| Individual DN Key                                                                                                                                                                                                                                                                                                                                                                   | -                      | -            | -                   | -                   |
| Dialed Number Identification Service and Name Display                                                                                                                                                                                                                                                                                                                               | -                      | -            | -                   | -                   |
| <b>Note 1:</b> Priority 1 service, not supported                                                                                                                                                                                                                                                                                                                                    |                        |              |                     |                     |
| <b>Note 2:</b> Priority 1 service, not supported except as an MCDN service interworking between two H.323 gateways if tunneled through a CS 2000.                                                                                                                                                                                                                                   |                        |              |                     |                     |
| <b>Note 3:</b> Communication Server 1000M requires Calling Name to be tunneled within an H.323 Setup message. In addition, for the CS 2000 to CS1000M direction, only private calls contain the MCDN private data for displaying Calling Name; public calls do NOT contain private MCDN data. Therefore, for public CS 2000 to CS1000M direction, Calling Display is not displayed. |                        |              |                     |                     |
| <b>Note 4:</b> Calling Name Delivery within the Core remains unchanged to either line agents or trunk agents; therefor, existing functionalities, restrictions, or limitations of Calling Name Delivery remain applicable.                                                                                                                                                          |                        |              |                     |                     |

| Service                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | S1000M interworking to |              |                     |                     |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|--------------|---------------------|---------------------|
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | CICM (nodal)           | CICM (SIP-T) | IAD gateway (nodal) | IAD gateway (SIP-T) |
| ACD-C and ACD-D reports                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | -                      | -            | -                   | -                   |
| Network message services                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | -                      | -            | -                   | -                   |
| Message Waiting Indication                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Note 1                 |              |                     |                     |
| Network Authorization Code                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | -                      | -            | -                   | -                   |
| Network Speed Call                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | -                      | -            | -                   | -                   |
| Network Class of Service (NCOS)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | x                      | x            | x                   | x                   |
| Remote Virtual Queuing                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | -                      | -            | -                   | -                   |
| Attendant and Network Wide Remote Call Forward                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | -                      | -            | -                   | -                   |
| Flexible Numbering Plan                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | -                      | -            | -                   | -                   |
| Network Wide Calling Party Privacy                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | -                      | -            | -                   | -                   |
| Display of Calling Party Denied                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | -                      | -            | -                   | -                   |
| Trunk Anti-Tromboning (TAT)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | -                      | -            | -                   | -                   |
| Calling Party Privacy Enhancements                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | -                      | -            | -                   | -                   |
| <p><b>Note 1:</b> Priority 1 service, not supported</p> <p><b>Note 2:</b> Priority 1 service, not supported except as an MCDN service interworking between two H.323 gateways if tunneled through a CS 2000.</p> <p><b>Note 3:</b> Communication Server 1000M requires Calling Name to be tunneled within an H.323 Setup message. In addition, for the CS 2000 to CS1000M direction, only private calls contain the MCDN private data for displaying Calling Name; public calls do NOT contain private MCDN data. Therefore, for public CS 2000 to CS1000M direction, Calling Display is not displayed.</p> <p><b>Note 4:</b> Calling Name Delivery within the Core remains unchanged to either line agents or trunk agents; therefor, existing functionalities, restrictions, or limitations of Calling Name Delivery remain applicable.</p> |                        |              |                     |                     |

| Service                                                                                                                                                                                                                                                                                                                                                                             | S1000M interworking to |              |                     |                     |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|--------------|---------------------|---------------------|
|                                                                                                                                                                                                                                                                                                                                                                                     | CICM (nodal)           | CICM (SIP-T) | IAD gateway (nodal) | IAD gateway (SIP-T) |
| Integrated Services Access (ISA)                                                                                                                                                                                                                                                                                                                                                    | -                      | -            | -                   | -                   |
| Network Alternate Route Selection                                                                                                                                                                                                                                                                                                                                                   |                        |              |                     |                     |
| NARS Access Codes                                                                                                                                                                                                                                                                                                                                                                   | -                      | -            | -                   | -                   |
| Uniform Dialing Plan                                                                                                                                                                                                                                                                                                                                                                | -                      | -            | -                   | -                   |
| Coordinated Dialing Plan                                                                                                                                                                                                                                                                                                                                                            | -                      | -            | -                   | -                   |
| Time of Day Routing                                                                                                                                                                                                                                                                                                                                                                 | -                      | -            | -                   | -                   |
| Network Routing Control                                                                                                                                                                                                                                                                                                                                                             | -                      | -            | -                   | -                   |
| Satellite link control                                                                                                                                                                                                                                                                                                                                                              | -                      | -            | -                   | -                   |
| Digit screening                                                                                                                                                                                                                                                                                                                                                                     | -                      | -            | -                   | -                   |
| Digit manipulation                                                                                                                                                                                                                                                                                                                                                                  | -                      | -            | -                   | -                   |
| Auto on-net to off-net overflow                                                                                                                                                                                                                                                                                                                                                     | -                      | -            | -                   | -                   |
| Automatic least cost routing                                                                                                                                                                                                                                                                                                                                                        | -                      | -            | -                   | -                   |
| Automatic OCC access                                                                                                                                                                                                                                                                                                                                                                | -                      | -            | -                   | -                   |
| Expensive Route Warning Tone                                                                                                                                                                                                                                                                                                                                                        | -                      | -            | -                   | -                   |
| Data packet network Access                                                                                                                                                                                                                                                                                                                                                          | -                      | -            | -                   | -                   |
| <b>Note 1:</b> Priority 1 service, not supported                                                                                                                                                                                                                                                                                                                                    |                        |              |                     |                     |
| <b>Note 2:</b> Priority 1 service, not supported except as an MCDN service interworking between two H.323 gateways if tunneled through a CS 2000.                                                                                                                                                                                                                                   |                        |              |                     |                     |
| <b>Note 3:</b> Communication Server 1000M requires Calling Name to be tunneled within an H.323 Setup message. In addition, for the CS 2000 to CS1000M direction, only private calls contain the MCDN private data for displaying Calling Name; public calls do NOT contain private MCDN data. Therefore, for public CS 2000 to CS1000M direction, Calling Display is not displayed. |                        |              |                     |                     |
| <b>Note 4:</b> Calling Name Delivery within the Core remains unchanged to either line agents or trunk agents; therefor, existing functionalities, restrictions, or limitations of Calling Name Delivery remain applicable.                                                                                                                                                          |                        |              |                     |                     |

| Service                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | S1000M interworking to |              |                     |                     |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|--------------|---------------------|---------------------|
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | CICM (nodal)           | CICM (SIP-T) | IAD gateway (nodal) | IAD gateway (SIP-T) |
| Customer Network Manipulation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | -                      | -            | -                   | -                   |
| Direct Private Network Access                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | -                      | -            | -                   | -                   |
| Electronic Tandem Network                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | -                      | -            | -                   | -                   |
| Meridian Switched Network<br>Variable Types of Outpulsing on Same Call                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | -                      | -            | -                   | -                   |
| Network CLID and NCOS<br>Display Interaction with 3WC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | -                      | -            | -                   | -                   |
| Network Dial Plan Display                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | -                      | -            | -                   | -                   |
| Network Reason Display                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | -                      | -            | -                   | -                   |
| Network Information Signals                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | -                      | -            | -                   | -                   |
| Network Queuing, Main Network<br>Signaling (NSIG)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | -                      | -            | -                   | -                   |
| Network Traffic Measurement                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | -                      | -            | -                   | -                   |
| Time-of-Day Network Class of<br>Service (NCOS)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | -                      | -            | -                   | -                   |
| Multi-location business groups<br>(MBG)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Note 1                 |              |                     |                     |
| <p><b>Note 1:</b> Priority 1 service, not supported</p> <p><b>Note 2:</b> Priority 1 service, not supported except as an MCDN service interworking between two H.323 gateways if tunneled through a CS 2000.</p> <p><b>Note 3:</b> Communication Server 1000M requires Calling Name to be tunneled within an H.323 Setup message. In addition, for the CS 2000 to CS1000M direction, only private calls contain the MCDN private data for displaying Calling Name; public calls do NOT contain private MCDN data. Therefore, for public CS 2000 to CS1000M direction, Calling Display is not displayed.</p> <p><b>Note 4:</b> Calling Name Delivery within the Core remains unchanged to either line agents or trunk agents; therefor, existing functionalities, restrictions, or limitations of Calling Name Delivery remain applicable.</p> |                        |              |                     |                     |

| Service                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | S1000M interworking to |              |                     |                     |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|--------------|---------------------|---------------------|
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | CICM (nodal)           | CICM (SIP-T) | IAD gateway (nodal) | IAD gateway (SIP-T) |
| Virtual Access to Private Networks (VAPN)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | -                      | -            | -                   | -                   |
| Direct Inward System Access (DISA)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | -                      | -            | -                   | -                   |
| <p><b>Note 1:</b> Priority 1 service, not supported</p> <p><b>Note 2:</b> Priority 1 service, not supported except as an MCDN service interworking between two H.323 gateways if tunneled through a CS 2000.</p> <p><b>Note 3:</b> Communication Server 1000M requires Calling Name to be tunneled within an H.323 Setup message. In addition, for the CS 2000 to CS1000M direction, only private calls contain the MCDN private data for displaying Calling Name; public calls do NOT contain private MCDN data. Therefore, for public CS 2000 to CS1000M direction, Calling Display is not displayed.</p> <p><b>Note 4:</b> Calling Name Delivery within the Core remains unchanged to either line agents or trunk agents; therefor, existing functionalities, restrictions, or limitations of Calling Name Delivery remain applicable.</p> |                        |              |                     |                     |

### S1000M interworking to CICM, international services

The following table lists the International services that are currently supported by H.323 for S1000M interworking to CICM and IAD gateway for nodal calls, and calls through SIP-T.

| Service                            | BCM interworking to |              |                     |                     |
|------------------------------------|---------------------|--------------|---------------------|---------------------|
|                                    | CICM (nodal)        | CICM (SIP-T) | IAD gateway (nodal) | IAD gateway (SIP-T) |
| Basic Call                         | x                   | x            | x                   | x                   |
| Calling Line Identification (CLID) |                     |              |                     |                     |
| Calling Number Delivery            | x                   | x            | x                   | x                   |
| Connected Number Delivery          | x                   | x            |                     |                     |
| Called Number Delivery             | x                   | x            |                     |                     |
| Network Call Party Name Display    |                     |              |                     |                     |

| Service                         | BCM interworking to |              |                     |                     |
|---------------------------------|---------------------|--------------|---------------------|---------------------|
|                                 | CICM (nodal)        | CICM (SIP-T) | IAD gateway (nodal) | IAD gateway (SIP-T) |
| Calling Party Name Delivery     | x                   | x            | x                   | x                   |
| Network Call Redirection        |                     |              |                     |                     |
| Network Call Forward All Calls  | x                   | x            | x                   | x                   |
| Network Call Forward No Answer  | x                   | x            | x                   | x                   |
| Network Call Forward Busy       | x                   | x            | x                   | x                   |
| Call Transfer                   | x                   | x            | x                   | x                   |
| Call Pickup                     | x                   | x            | x                   | x                   |
| Network Class of Service (NCOS) | x                   | x            | x                   | x                   |

### International DPNSS services on CS 2000

The following table represents the set of DPNSS services as part of (I)SN07.

| DPNSS Service                                                                                                                                                                                                                                                                                                                                         | Nodal Transit (Note 1) | Net-work Transit (Note 2) | End Node Calling/ Called | Comment                                                                                         |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|---------------------------|--------------------------|-------------------------------------------------------------------------------------------------|
| CLI Display                                                                                                                                                                                                                                                                                                                                           | X                      | X                         | X                        |                                                                                                 |
| Busy Information                                                                                                                                                                                                                                                                                                                                      | X                      | X                         | X                        |                                                                                                 |
| CBWF                                                                                                                                                                                                                                                                                                                                                  | X                      | X                         | X                        |                                                                                                 |
| Executive intrusion                                                                                                                                                                                                                                                                                                                                   | X                      | X                         | X                        | This feature is blocked and not supported for lines where the intruded party is on the CS 2000. |
| <p><b>Note 1:</b> Nodal Transit refers to a transit configuration where CS 2000 acts as a “pure transit” with Westell gateways serving as both Ingress and Egress gateways.</p> <p><b>Note 2:</b> Network transit refers to a supporting DPNSS signaling transparency (DFT) across the network through IBN7 DFT (or SIP-T) proprietary signaling.</p> |                        |                           |                          |                                                                                                 |

| DPNSS Service                                                                                                                                                                                                                                                                                                                                         | Nodal Transit (Note 1) | Net-work Transit (Note 2) | End Node Calling/ Called | Comment                               |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|---------------------------|--------------------------|---------------------------------------|
| Divert on No Reply                                                                                                                                                                                                                                                                                                                                    | X                      | X                         | X                        | Both with/without drop-back diversion |
| Divert on Busy                                                                                                                                                                                                                                                                                                                                        | X                      | X                         | X                        | Both with/without drop-back diversion |
| Divert-Immediate                                                                                                                                                                                                                                                                                                                                      | X                      | X                         | X                        | Both with/without drop-back diversion |
| HOLD                                                                                                                                                                                                                                                                                                                                                  | X                      | X                         | X                        |                                       |
| Call Offer                                                                                                                                                                                                                                                                                                                                            | X                      | X                         | X                        |                                       |
| Call Waiting                                                                                                                                                                                                                                                                                                                                          | X                      | X                         | X                        |                                       |
| ROP                                                                                                                                                                                                                                                                                                                                                   | X                      | X                         | X                        |                                       |
| Three-Party Call                                                                                                                                                                                                                                                                                                                                      | X                      | X                         | X                        |                                       |
| Non-Specified Information                                                                                                                                                                                                                                                                                                                             | X                      | X                         | X                        |                                       |
| Service-Independent strings                                                                                                                                                                                                                                                                                                                           | X                      | X                         | X                        |                                       |
| Redirection                                                                                                                                                                                                                                                                                                                                           | X                      | X                         |                          |                                       |
| Series Call                                                                                                                                                                                                                                                                                                                                           | X                      | X                         |                          |                                       |
| Night Service                                                                                                                                                                                                                                                                                                                                         | X                      | X                         |                          |                                       |
| Centralized Operator                                                                                                                                                                                                                                                                                                                                  | X                      | X                         |                          |                                       |
| Extension Status                                                                                                                                                                                                                                                                                                                                      | X                      | X                         |                          |                                       |
| Controlled Diversion                                                                                                                                                                                                                                                                                                                                  | X                      | X                         |                          |                                       |
| Three-Party takeover                                                                                                                                                                                                                                                                                                                                  | X                      | X                         |                          |                                       |
| <p><b>Note 1:</b> Nodal Transit refers to a transit configuration where CS 2000 acts as a “pure transit” with Westell gateways serving as both Ingress and Egress gateways.</p> <p><b>Note 2:</b> Network transit refers to a supporting DPNSS signaling transparency (DFT) across the network through IBN7 DFT (or SIP-T) proprietary signaling.</p> |                        |                           |                          |                                       |

| DPNSS Service                                                                                                                                                                                                                                                                                                                                         | Nodal Transit (Note 1) | Net-work Transit (Note 2) | End Node Calling/ Called | Comment |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|---------------------------|--------------------------|---------|
| Remote Alarm Reporting                                                                                                                                                                                                                                                                                                                                | X                      | X                         |                          |         |
| Add-on Conference                                                                                                                                                                                                                                                                                                                                     | X                      | X                         |                          |         |
| Time Synchronization                                                                                                                                                                                                                                                                                                                                  | X                      | X                         |                          |         |
| Call Back When Next Used                                                                                                                                                                                                                                                                                                                              | X                      | X                         |                          |         |
| Do not Disturb                                                                                                                                                                                                                                                                                                                                        | X                      | X                         |                          |         |
| Remote Registration of Diversion                                                                                                                                                                                                                                                                                                                      | X                      | X                         |                          |         |
| Remote Registration of Do not Disturb                                                                                                                                                                                                                                                                                                                 | X                      | X                         |                          |         |
| Priority Breakdown                                                                                                                                                                                                                                                                                                                                    | X                      | X                         |                          |         |
| Call Back Messaging                                                                                                                                                                                                                                                                                                                                   | X                      | X                         |                          |         |
| Forced Release                                                                                                                                                                                                                                                                                                                                        | X                      | X                         |                          |         |
| Text Message                                                                                                                                                                                                                                                                                                                                          | X                      | X                         |                          |         |
| Charge Reporting                                                                                                                                                                                                                                                                                                                                      | X                      | X                         |                          |         |
| Network Address Extension                                                                                                                                                                                                                                                                                                                             | X                      | X                         |                          |         |
| Call Park                                                                                                                                                                                                                                                                                                                                             | X                      | X                         |                          |         |
| Call Distribution                                                                                                                                                                                                                                                                                                                                     | X                      | X                         |                          |         |
| <p><b>Note 1:</b> Nodal Transit refers to a transit configuration where CS 2000 acts as a “pure transit” with Westell gateways serving as both Ingress and Egress gateways.</p> <p><b>Note 2:</b> Network transit refers to a supporting DPNSS signaling transparency (DFT) across the network through IBN7 DFT (or SIP-T) proprietary signaling.</p> |                        |                           |                          |         |

| DPNSS Service                                                                                                                                                                                                                                                                                                                                         | Nodal Transit (Note 1) | Net-work Transit (Note 2) | End Node Calling/ Called | Comment |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|---------------------------|--------------------------|---------|
| Route Capacity Control                                                                                                                                                                                                                                                                                                                                | X                      | X                         |                          |         |
| Wait on Busy                                                                                                                                                                                                                                                                                                                                          | X                      | X                         |                          |         |
| Call Pick-up                                                                                                                                                                                                                                                                                                                                          | X                      | X                         |                          |         |
| Traveling Class of Service                                                                                                                                                                                                                                                                                                                            | X                      | X                         |                          |         |
| Number Presentation Restriction                                                                                                                                                                                                                                                                                                                       | X                      | X                         |                          |         |
| <p><b>Note 1:</b> Nodal Transit refers to a transit configuration where CS 2000 acts as a “pure transit” with Westell gateways serving as both Ingress and Egress gateways.</p> <p><b>Note 2:</b> Network transit refers to a supporting DPNSS signaling transparency (DFT) across the network through IBN7 DFT (or SIP-T) proprietary signaling.</p> |                        |                           |                          |         |

**International DPNSS / Centrex services**  
The following table represents the set of DPNSS / Centrex services as part of (I)SN07.

| DPNSS Service                   | Nodal Transit | Net-work Transit | End Node Calling/ Called | Comment |
|---------------------------------|---------------|------------------|--------------------------|---------|
| Meet Me Conference (Flash only) | X             | X                | X                        |         |
| Station Controlled Conference   | X             | X                | X                        |         |
| Permanent hold                  | X             | X                | X                        |         |
| Three-Way Call                  | X             | X                | X                        |         |
| Call Waiting (Direct Answer)    | X             | X                | X                        |         |
| Make set Busy                   | X             | X                | X                        |         |

| <b>DPNSS Service</b>      | <b>Nodal Transit</b> | <b>Net-work Transit</b> | <b>End Node Calling/ Called</b> | <b>Comment</b>                 |
|---------------------------|----------------------|-------------------------|---------------------------------|--------------------------------|
| Malicious call hold       | X                    | X                       | X                               |                                |
| Blind Call Transfer       | X                    | X                       | X                               |                                |
| Call Transfer             | X                    | X                       | X                               |                                |
| Call Park                 | X                    | X                       | X                               |                                |
| Call Park Retrieve        | X                    | X                       | X                               |                                |
| Call Pick-up              | X                    | X                       | X                               |                                |
| Call Forward Don't Answer | X                    | X                       | X                               | The forwarding is over UKISUP. |
| Call Forward Immediate    | X                    | X                       | X                               | The forwarding is over UKISUP. |
| Call Forward Busy         | X                    | X                       | X                               | The forwarding is over UKISUP. |



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## Customer support

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### Solution and customer support

Nortel Networks provides solution support using standard Customer Service Center (CSC) and Global Product Support (GPS) policies and procedures. For issues that cannot be resolved, contact Nortel Networks regional CSC and a representative to open a Change Request (CR). If the regional representative cannot resolve the problem, the CSC representative refers the matter to the next level of support to provide either an answer to the problem or corrective action.

Corrective action can include the following:

- amendment in a future software release
- incremental software update (patch)
- customer information change
- request for feature development to address new or changed functionality

Once the problem is resolved, the customer is notified and the CR is closed.

### Customer information

#### Software release and support policy

A software release consists of the Call Server PCL (solution computing load) and the Nortel Networks brand network element software loads that are required for the solution. The third-party software support policy remains in effect for third-party network element software sold by Nortel Networks in conjunction with a software release.

#### Ordering and support overview

A Software Release can be ordered either before or within 12 months after reaching First Volume Ship (FVS) status. It is priced at the applicable contract terms for right-to-use and generic load insertion fees.

Nortel Networks does not recommend using retired (unsupported) software releases in existing offices and does not deploy a retired release to an initial (new) installation or an extension. Therefore, each individual Software Release application of a given software release must be scheduled to occur before the retirement of that release. This requirement must be considered when placing an order toward the end of the active stage of a particular release.

Full software support—including both emergency-outage and non-emergency support—is available until 12 months after FVS of the release. Support is available for retired releases only under a separate service contract, and is limited to support that does not require patching or other design effort.

### Software upgrade path overview

Generally, software releases reach FVS status about every 6 months. Thus, at the end of the 6 months after FVS of a software release, another new release becomes available for ordering and loading. The network provider can choose either to deploy this next software release in sequence or to skip to one release. If skipping more than one release is required, one or more of the skipped releases must be temporarily inserted (at extra cost) to enable loading of the desired release.

**Note:** Any updates or exceptions to the Software Release and Support Policy must be made through Solution/Service Update and/or Solution/Service Information publications. Contact your Nortel Networks representative for more information about Nortel Networks software development cycles and software administrative policy.

### Optional support package overview

The following table lists the components that require optional support packages for software support. Some of these optional support packages require the network element be upgraded to the latest software release when the standard software support expires.

### Standard software support policy

| Components                                      | Standard software support policy                                                                                                                         |
|-------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| VPN Router 600                                  | Software support is available for the last published software release and one release back (including their associated patches, fixes, and workarounds). |
| Ethernet Routing Switch 8600/Device Manager     | Software support is available for the last published software release and one release back (including their associated patches, fixes and workarounds).  |
| Nortel Networks Multiservice Data Manager (MDM) | Software releases are supported for 2 years (24 months) after declaration of GA. This policy applies to MDM 13.3 and later software releases.            |

**Note:** In addition to the optional support packages, Nortel Networks offers extended warranty support at an additional charge based on agreements with your account representative. For more information on the software support policies available for these components, contact your regional Nortel Networks representative.

### **Service bundling**

Customers can purchase the following additional services:

- software upgrades
- technical support services
- emergency recovery services such as disaster recovery options
- hardware repair services outside of warranty coverage
- applications and migration support
- audits and evaluations
- operations training
- call response coverage
- electronic software delivery
- mentoring services

### **Web site information**

Nortel Networks Web site, [www.nortelnetworks.com](http://www.nortelnetworks.com), is a valuable site for customer information, support, and services. From this site, the customer can acquire information on customer service, training, and documentation, professional services, and other areas of business.

### **Customer responsibilities**

The information in this section is intended for use by Nortel Networks Sales, Business and Development, and Marketing personnel who are responsible for ensuring that customers are aware of and agree with their responsibilities when discussing the solution. Additionally, these responsibilities must be written into any subsequent contracts which result from such discussions or negotiations.

### **Security requirements for DMS and SPM based-equipment software loads**

Access from the Nortel Networks electronic software delivery server to a customer's server is over a switched circuit, and user identification and password provide security. To log in from the Nortel Networks electronic software delivery server to the customer LAN/WAN, the security algorithm is used. For Nortel Networks Multiservice Data Manager software loads, the Nortel Networks electronic software

delivery system uses a secure-access system. The customer login ID and passwords are managed as part of the POL suite.

## **Training and documentation**

This section provides information about who to contact and where to get customer documentation and training.

### **Contacting Nortel Networks for help on customer information**

Contact the Nortel Networks account prime for help on customer information.

### **Customer information**

Nortel Networks provides customer information on a CD. The customer CD provides component-level and solution-level customer information, which includes information in the following areas:

- Basics
- Network upgrades
- Fault management
- Operational configuration
- Accounting
- Performance
- Security and administration

### **Legacy information**

For legacy information, refer to the DMS-100 Family suite of documents that are available through Helmsweb.

### **Where to get customer documentation**

Documentation for each Voice over IP Network solution is delivered on a CD ROM.

For valuable customer information, refer to the Nortel Networks Web site for customer information, support, and services:

[www.nortelnetworks.com](http://www.nortelnetworks.com)

From this site, you can get information on customer service, training and documentation, professional services, and other areas of business.

Refer to the corresponding documentation on the following components associated with the CHS solution:

- CS 2000
- CS 2000 - Compact
- CS 2000 Management Tools
- Gateway Controller
- Nortel Networks Multiservice Switch 15000 and 20000
- Nortel Networks Multiservice Data Manager
- MDM
- UAS
- USP
- USP - Compact
- XA-Core

## BCM

BCM information is located in the Business Communications Manager 3.7 collection in Helmsman. In particular, refer to:

**Note:** These documents are also distributed on each BCM hard drive, and can be accessed through the BCM's Unified Manager interface.

| BCM documents | Title                            |
|---------------|----------------------------------|
| N0008589      | Programming Operations Guide     |
| N0008591      | IP Telephony Configuration Guide |

## CS1000 and CS 1000M

Refer also to the following CS1000 and CS1000M documents located in the Succession 3.0 collection in Helmsman Express.

| CS 1000 / CS 1000M | Title                                                                    |
|--------------------|--------------------------------------------------------------------------|
| 555-3001-000       | Library Navigator (contains a description of all NTPs in the collection) |
| 555-3001-213       | IP Peer Networking                                                       |
| 555-3001-363       | IP Trunk: Description, Installation and Operation                        |

| CS 1000 / CS 1000M | Title                                                                |
|--------------------|----------------------------------------------------------------------|
| 553-3001-365       | IP Line: Description, Installation and Operation                     |
| 553-3031-258       | Nortel Networks Communication Server 1000 System: Upgrade Procedures |

### Meridian 1

Meridian 1 information is located in the **Meridian 1** collection in Helmsman Express.

### MCS 5100

For SIP Converged Desktop Services information on the MCS 5100 3.0 documentation suite, refer to the **Multimedia Communication Portfolio** collection in Helmsman Express.

### CICM documentation

Refer to the following Centrex IP Call Manager (CICM) documentation located in the **Succession Network Solutions** documentation under **Global - Carrier Hosted Services Solutions** in Helmsman Express.

| CICM         | Title                                                              |
|--------------|--------------------------------------------------------------------|
| NN10027-113  | CICM Etherset Installation Guide and User Manual                   |
| NN10182-113  | m6350 Softclient Installation Guide                                |
| NN10183-114  | m6350 Softclient Branding Kit                                      |
| 297-5551-901 | m6350 TAPI Service Provider Installation and Troubleshooting Guide |
| NN10044-111  | CICM Basics                                                        |
| NN10230-461  | CICM Upgrades                                                      |
| NN10027-111  | CICM Fault Management                                              |
| NN10240-511  | CICM Configuration Management                                      |
| NN10244-811  | CICM Accounting Management                                         |
| NN10248-711  | CICM Performance Management                                        |
| NN10252-611  | CICM Security and Administration                                   |

### Session Server

Refer to the following Session Server documentation located in the **Succession Network Solutions** documentation under **Global - Carrier Hosted Services Solutions** in Helmsman Express.

| Session Server | Title                                      |
|----------------|--------------------------------------------|
| NN10332-911    | Session Server Fault Management            |
| NN10333-111    | Session Server Basics                      |
| NN10338-511    | Session Server Configuration               |
| NN10342-711    | Session Server Performance Management      |
| NN10346-611    | Session Server Security and Administration |
| NN10349-461    | Session Server Upgrades                    |
| NN10332-911    | Session Server Fault Management            |

### RTP Portal

For more information about the dedicated configuration to support MCS RTP Media Portals associated with the CS 2000, refer to the following table of documents located in the **Multimedia Communication Portfolio** collection in Helmsman Express.

| RTP Media Portal dedicated configuration | Title                                  |
|------------------------------------------|----------------------------------------|
| NN10369-111                              | CVoIP System Manager Basics            |
| NN10368-111                              | CVoIP Database Manager Basics          |
| NN10370-111                              | CVoIP System Management Console Basics |

For more information on the MCS RTP Media Portal when in association with a CS 2000 refer to the following document located in the **Multimedia Communication Portfolio** collection in Helmsman Express.

| RTP Media Portal interop with CS 2000 | Title                         |
|---------------------------------------|-------------------------------|
| NN10367-111                           | CVoIP RTP Media Portal Basics |

For more information on the RTP Media Portal, refer to the following document located in the **Multimedia Communication Portfolio** collection in Helmsman Express.

| RTP Media Portal | Title                            |
|------------------|----------------------------------|
| NN10035-111      | MCS 5200 RTP Media Portal Basics |

### **MCS 5200 interworking**

For MCS 5200 interworking information, refer to the following document.

| MCS interworking | Title                        |
|------------------|------------------------------|
| NN10372-111      | MCS 5200 Interworking Basics |

For more information on the MCS 5200 documentation suite, refer to the **Multimedia Communication Portfolio** collection in Helmsman Express.

### **Where to get training information**

All course descriptions, prerequisites, schedules, and locations can be viewed at [www.nortelnetworks.com](http://www.nortelnetworks.com).

**Note:** For the most recent curriculum information, contact Nortel Networks Training and Documentation representative. For enrollment assistance, contact Training registration at 1-800-4-NORTEL (1-800-466-7835), express routing code #280.

### **Acme Packet training**

Course descriptions, locations and information specific to Acme Packet products can be found at [www.acmepacket.com](http://www.acmepacket.com). Select Training from the Support menu for a list of courses currently available, or contact [traning@acmepacket.com](mailto:traning@acmepacket.com) for further inquiries and registration.

### **Professional services**

An extensive set of professional services accompany the IP solutions. These services are offered in addition to the engineering, installation, and commissioning services that are part of the base solution.

Services are defined and selected according to the needs of the customer and range from turnkey solutions to products that assist the customer in specific tasks and in acquiring needed skills.

The initial set of services offered as part of the IP solutions are as follows:

- business and market planning services
- network planning and design to cover the packet network, TDM network, operations networks, and access networks
- operations planning realization
- business contingency and disaster recovery planning
- program and project management
- translations for CS 2000 and for the Nortel Networks Media Gateway (formerly Passport) 15000
- packet configuration
- LAN design and setup and manager setup
- MSS and security planning, implementation, and integration
- network test and verification
- feature migration services
- facility cut-over services
- surveillance, maintenance, provisioning, and customer care services
- enhanced Technical Assistance Service (TAS) support services
- removal of old equipment

Additional services are available on a custom basis, if required. For more details, refer to the [Service bundling](#) section.

### **Operations support services**

Nortel Networks provides TAS and Emergency Technical Assistance Support (ETAS). The TAS and ETAS technical personnel investigate and resolve problems that customers encounter while operating the covered switching systems.

Requests and operational problems are classified according to severity and overall effect on the system.

**Routine TAS, S1 and S2**

The service provides the following help for customers:

- coverage during Nortel Networks business hours or as scheduled with a TAS supervisor
- response from Nortel Networks as soon as practical, according to the severity of the problem. Assistance is provided through telephone and/or remote access.
- diagnosis of cause and recommended actions to restore operational stability
- TAS-initiated on-site assistance made necessary by non-emergency conditions and covered by the Service and Support Plan (S&SP)
- Customer-initiated, on-site assistance available through mutual agreement and dispatched within 4 hours of mutual agreement. Additional charges are billed for travel and per diem expense, plus the current hourly rate.

Technical Assistance Support can be reached between the hours of 8:00 a.m. and 5:00 p.m. (CST), Monday through Friday.

**ETAS, E1 and E2**

This service provides the following help for customers:

- Coverage 24 hours a day, 7 days a week
- Immediate assistance through telephone and/or remote access
- Diagnosis of cause and recommended actions to restore operational stability
- ETAS-initiated on-site assistance made necessary by emergency conditions and covered by the S&SP
- Customer-initiated on-side assistance, available through mutual agreement and dispatched within 4 hours of mutual agreement. Additional charges are billed for travel and per diem expense, plus the current hourly rate.

Emergency Technical Assistance Support can be reached 24 hours a day, 7 days a week.

**Escalation procedure**

If customer needs are not met at the TAS representative level, the matter can be escalated by contacting the following persons, in sequential order:

- Manager, Technical Assistance Service
- Senior Manager, Technical Assistance Service
- Director, Technical Assistance Services
- Director, Service Operations

